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FLIGHT and The AIRCRAFT ENGINEER

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The Outlook

German Fighter Shortage

THE smart manœuvres by which the Americans landed troops on the northern shore of Sicily behind the German lines were largely due to the complete air supremacy won by the United Nations in the Mediterranean. The trips were made by night, but ships have often been spotted by night when enemy reconnaissance aircraft are thick over the area. Such a discovery would be nothing new to the crews of Coastal Command Hudsons. In this case no enemy reconnaissance machines were about, or were expected to be about, because the Allied fighters had put a stop to all such activities and had cleared the skies round Sicily. German and Italian fighters had ceased to dispute with them.

The same sort of thing is reported from the Russian front. In one of the recent attacks by the Red Army it was stated that their fighters absolutely dominated the air over the battle, and allowed their ground troops and their bombers to get on with their respective tasks without any interference by German bombers. In each case the cause was the inability of the German fighters to hold their own.

This shortage of fighter aircraft in the *Luftwaffe* in the fourth year of the war is a somewhat remarkable thing. There has been no claim by the R.A.F. that its bombing offensive has done any crippling damage to German aircraft factories, though here and there some have been hit by bombs. The reason must be sought farther back, in the plans laid by Göring before the war. The Me 109 was put on production, being at the time about the fastest fighter in service with any Air Force.

All the German leaders looked forward to the coming campaigns as affairs in which they would constantly be on the offensive—as, indeed, they were for well nigh three years—and as fighters were regarded as defensive weapons, the number provided doubtless seemed more than ample. The position which has now come into being, with Germany on the defensive on many fronts, was not foreseen. Least of all could the German High Command have conceived the idea of R.A.F. Fighter Command taking the offensive over occupied France and there tying up a large number of German fighter squadrons.

Evidence has lately been received that the Germans are trying to increase their production of fighters at the expense of their bomber force, but the effort has come too late to affect the fate of Sicily (perhaps of all Italy) or to hold back the Russians. There are plenty of German bombers on the Eastern front, but without fighter protection of adequate strength their numbers are largely nullified.

Neutrals and Distressed Airmen

REUTER'S correspondent at Istanbul has reported that the Turkish Government has decided to release the seven American airmen whose aircraft crashed into the sea off the coast of Turkey while on its way back from the bombing raid on the Ploesti oil refineries. It is an interesting point, because international law has not yet become crystallised about air warfare, and has to rely on precedents established by centuries of sea warfare.

As regards airmen who come down on neutral territory through shortage of fuel or damage to their aircraft, their case is governed by the Air Warfare Rules drawn up at the Hague in 1923. Article 42 of those rules lays it down that: "A neutral Government shall use the means at its disposal to intern any belligerent military aircraft which is within its jurisdiction after having alighted for any reason whatsoever, together with its crew and passengers, if any."

The airmen in question, however, did not land on

Turkish soil but came down in the sea, were picked up and taken ashore. It seems, therefore, that they were legally in the position of distressed mariners, and to them other rules apply. Several cases of this occurred during the last war, among them that of Flt. Cdr. (as he then was) F. E. T. Hewlett, R.N.V.R., who was rescued by a Dutch trawler after the Cuxhaven raid of Christmas Day, 1914, and was released after a brief detention in Holland. A French writer, M. Lafon, said that the Dutch had the courtesy to liberate Cdr. Hewlett in lieu of interning him, as would have been their right. On this Mr. J. M. Spaight comments in his book, *Air Power and War Rights*: "It was hardly a matter of courtesy; rather it was one of unsettled international law and, on the naval analogy, there was considerably more reason for liberating the officer than for interning him."

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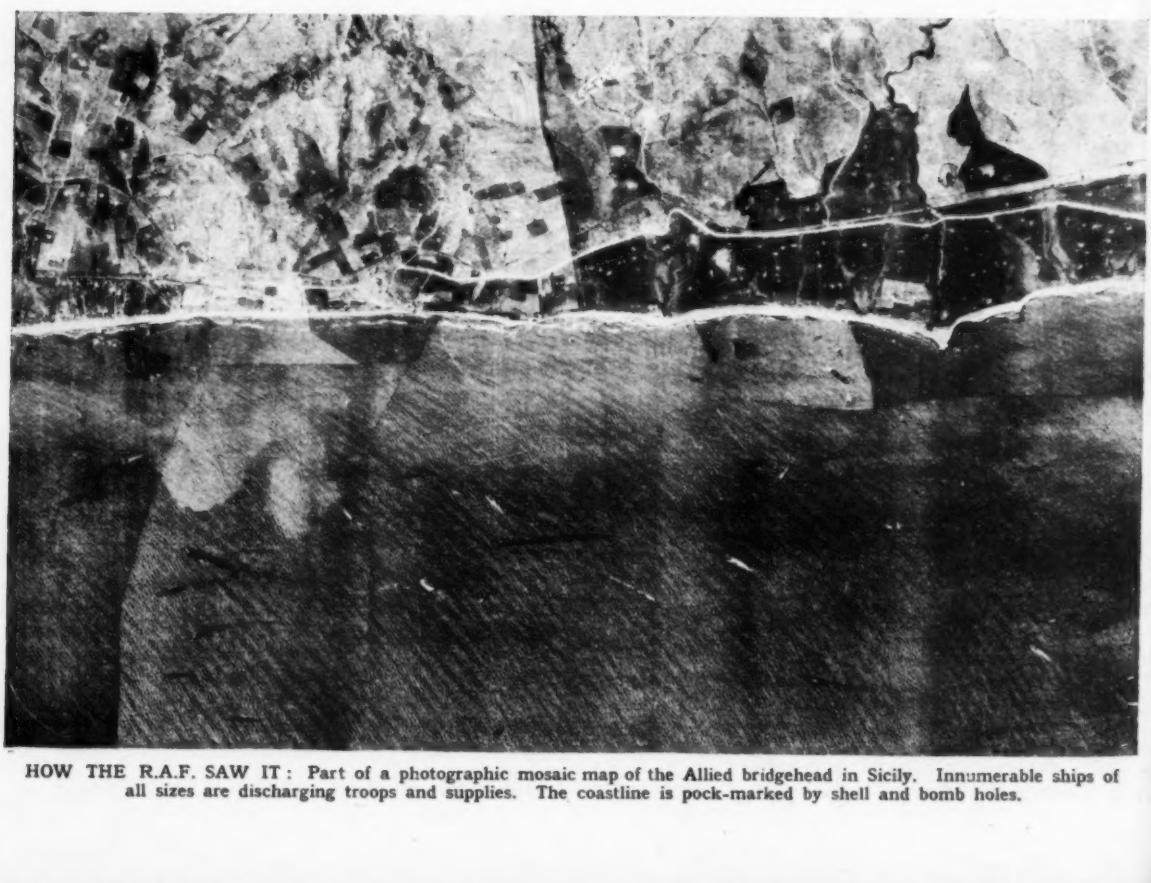
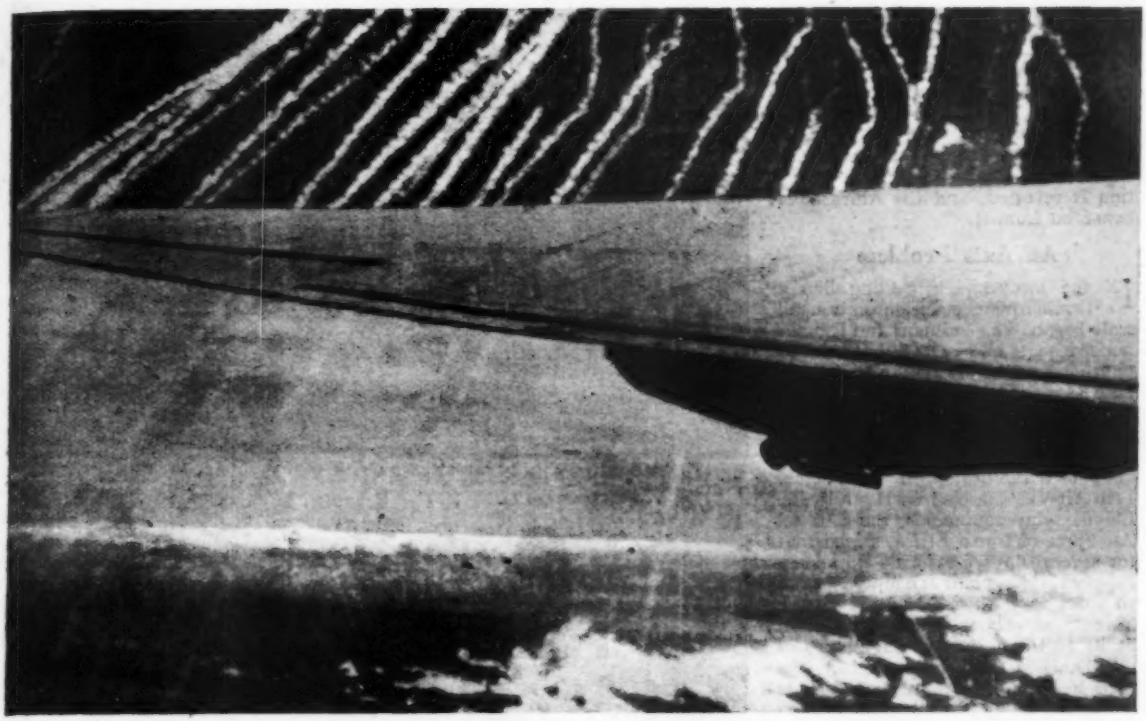
Technical Training

AIRCRAFT engineering was defined many years ago as "laboratory work on an engineering scale," and as "ordinary engineering made more difficult." The enormously increased complexity of modern aircraft has certainly not made those definitions less applicable to-day than they were when they were originally propounded. Granted that our knowledge has increased very greatly, and that aerodynamically, as well as structurally, we are able to "guess" much more accurately than before, he would be a bold man who would venture to claim that we know all about aircraft design. The high speeds now being attained have in some cases brought to light phenomena which are not as yet fully understood, and there is no indication that progress is slowing down. In fact, what with such new lines of development as jet propulsion and all-wing aircraft, not to mention the possibility of new and improved structural materials, there is good reason to believe that we are on the eve of changes as great as or greater than any which flying has seen in its 40 years of existence.

Bearing these facts in mind, the question of training aeronautical engineers has assumed an importance and urgency which no one with a knowledge of the facts will deny. Fortunately, there is evidence that the campaign in which *Flight* has taken part is beginning to bear fruit. The Royal Aeronautical Society discussions have played an important part, and the pleas advanced by many men prominent in aeronautics have carried the subject to still wider circles. In the House of Lords last month Lord Cherwell outlined the Government's efforts to act upon the views of the industry, and it was encouraging to find that the practical as well as the more theoretical side has not been overlooked.



HOW THE R.A.F. SAW IT: Part of a photographic mosaic map of the Allied bridgehead in Sicily. Innumerable ships of all sizes are discharging troops and supplies. The coastline is pock-marked by shell and bomb holes.



BOMBING THE BOMBERS: The Japanese are using time-fused bombs in an endeavour to break up Allied formations of bombers. It is an old idea which has proved not very effective. This photograph was taken from a Liberator over the south-west Pacific, as one of the bombs exploded in front of the formation.

WAR in the AIR

The Fighting in Sicily : The Ruhr Raided by R.A.F. and Americans : Fighter Command's Offensive

THE figure 999 indicates very meticulous care in counting. That is the number of aircraft captured by the Allies on Sicilian airfields, some of them in serviceable condition. The people responsible for the count must have longed to find just one more and so bring the number up to a round 1,000, but they evidently failed to do so. Still, the loss of so many machines must have been a nasty blow to the *Luftwaffe* and *Regia Aeronautica* at this time when their resources are strained to the utmost. The Italian Air Force no longer counts for much, but the careful way in which the Germans have withdrawn all possible machines from the neighbourhood of Sicily, leaving their ground forces there to fight it out without any air cover, shows how great is their need to conserve their aircraft.

The ground troops holding positions in the mountains were not in need of fighter protection, for the Allied bombers played no conspicuous part in helping the attack on those positions, but the roads on the way to Messina were heavily bombed and machine-gunned by every class and type of aircraft which the Allies could throw in. The enemy trying to escape by the roads must have cursed their absent airmen for doing nothing to help them in their distress. The German infantry who have got back to the mainland will have a depressing story to tell of the failure of their once-vaunted *Luftwaffe*.

The Royal Navy and the U.S. Navy helped by constantly shelling the roads towards Messina, and the former added to the sufferings of the district round Naples by sending a force of cruisers into the Gulf of Naples on the night of August 9th and shelling the shipbuilding and repair yards of Castellammare. As usual, Italian warships did not put in an appearance. The people of Naples itself doubtless spent another sleepless night. Whether they object more strongly to bombs from the air or shells from the sea, it is a matter for them to decide for themselves, but they must find both very unpleasant.

Effect of Air Supremacy

TWICE last week the Americans succeeded in landing forces from boats on the north coast of Sicily behind the enemy's lines. The landings were made by night, and the first one took the enemy completely by surprise. As a result, the landing party took the enemy in the rear, made prisoners, and finally joined up with the main forces which were advancing towards the eastern tip of the island.

The Germans were more or less ready for the second landing, and met it with hot fire from the shore, but this fire was countered by the guns of American warships lying off shore, and the troops succeeded in landing.

These little operations show the great advantage of holding undisputed command of the air and the sea. An enemy fighting along a coastline who has no power of interfering with movements by sea is bound to suffer a series

WAR IN THE AIR

of outflanking movements. That was the trouble from which the defenders of Malaya suffered when the Japanese commanded the sea and were very superior in the air. In Sicily the position is reversed, and the Allies have benefited from it.

An Axis Problem

IN the meantime something like a Dunkerque evacuation on a small scale began. The Germans and Italians massed boats and barges in the neighbourhood of the straits, and began to take some men away by night. By day the Allied Air Forces and warships took considerable toll of these craft, and by night, too, some of them were discovered and dealt with. On August 12th Air Vice-Marshal Sir Hugh Pughe Lloyd, who commands the Coastal Air Force of North Africa, stated that for several days previously no enemy supply shipping had attempted to run to Sicily, and that the enemy on the island was getting short of supplies, as he had done in the last phases of the Tunisian campaign. In fact, the Axis had a pretty problem to decide between getting stuff in and getting important men out, while both operations were extremely difficult. The only point in its favour was the narrowness of the Straits.

Following the plan of disrupting communications in Italy, Fortresses attacked the railway junction of Terni, some 40 miles to the north of Rome, through which trains could get between northern and southern Italy without passing through the yards at Rome, which were so heavily blitzed not long ago.

Deeper Into Germany

BOMBER COMMAND has been taking advantage of the lengthening nights to press further into Germany than was feasible during the height of the summer. The ending of British Double Summer Time is a matter of regret to many Britons who believe in the old adage about "early to bed and early to rise," but it has a far more poignant meaning for factory workers in the cities of western Germany. While the Navy was shelling in the Gulf of Naples, heavy bombers were making their way to the city of Mannheim-Ludwigshafen, where there are large chemical works. The place is also an important inland port. On the same night Mosquitoes visited the Ruhr, and the cost of the whole night's work was no more than nine British bombers. Next night Nuremberg was the target, which meant a round flight of over 1,100 miles. There are (or were) many targets of military importance in the place, but 1,500 tons of bombs must have reduced their importance to no small degree. On this occasion the R.A.F. loss was 16 machines, and that is a low proportion for a heavy raid.

AERIAL INVASION: (Top) British airborne troops getting ready to be taken over and dropped in Sicily. (Bottom) Standing by their Hadrian (CG4A) glider and watching other gliders take the air. When Hadrian last landed in Sicily in A.D. 126 he was on his way to Rome!

It is not very much further to Berlin than it is to Nuremberg. A certain degree of evacuation has been ordered from the German capital. At first the enemy tried to keep that fact secret, and dropped on a Swedish journalist who tried to report it, but since then the Germans have admitted it themselves. It is said that Berliners maintain their *moral* well when they hear of devastation in Essen and Hamburg, so long as their own lives are not involved. Their *sang froid* may not last much longer.

The Oil Question

THE recent raid by Liberators of the U.S. Army Ninth Air Force in the Middle East has been mentioned in *Flight* already. One R.A.F. officer, Sqn. Ldr. G. C. Barwell, D.F.C., accompanied the Liberators, and on his return to London he gave a vivid account of the splendid flying, discipline and heroism of the American aircrews. The damage to the oil stores and refineries was undoubtedly heavy, though the wells themselves are still able to produce the precious liquid. The supplies now reaching Germany must be severely cut down for the present, though it would certainly be an exaggeration to say that this one raid has struck a crippling blow.

The curtailment to an appreciable extent of the oil supplies from Rumania would obviously increase the value which the Germans place on the works which produce synthetic oil from coal. The Allied High Command was not slow to see what the next step ought to be, and accordingly on August 12th the U.S. Eighth Air Force, stationed in Britain, followed up the lead of its fellow Air Force in Egypt by making a daylight attack on the synthetic oil factories at Gelsenkirchen and Wesseling, in the Ruhr. The Fortresses flew at the greatest height yet used by machines of that type in the present war, but even so the *flak* was so heavy that one crew described it as "a black umbrella over Happy Valley." However high aircraft may fly, guns can be made which will be able to send shells up to the same height, though it may also be accepted as a principle that the greater the range the harder it must be to score hits. That principle applies to bomb-aiming as well as to A.A. fire, and that was why the Liberators flew as low as possible over Ploesti. After all the risks of an un-

WAR IN THE AIR

ENEMY AIR LOSSES TO AUG. 14th

	Over G.B.	Continent	Middle East	N.W. Africa
Aug. 8	0	0	0	7
" 9	0	10	0	4
" 10	0	3	0	6
" 11	1	1	0	0
" 12	0	3	0	0
" 13	0	0	1	15
" 14	0	2	0	1
	1	19	1	33

Totals: West, 7,213; Middle East, over 5,534; North West Africa, 2,767.

usually long penetration into enemy territory, the Ninth Air Force meant to be sure of hitting its very important targets. Over the Ruhr, however, the Eighth Air Force adopted the opposite tactics, in which they have been specially trained. There were other operations on the same day by both American bombers and R.A.F. Mosquitoes, and the total loss was 25 bombers, though it has not been stated how many of these were shot down over the Ruhr.

The raiding by day and night of targets in occupied territory goes on without intermission. The main part of the work is by day, and is carried out by fighters and fighter-bombers. Air combats are frequent, and many deeds of gallantry are done by British, Empire and Allied pilots and air gunners. Northern France is but a small section of all the occupied territory, and even if Belgium and Holland are added it still remains small. But the damage done to enemy communications and factories is by no means negligible, particularly the shooting-up of railway engines.

AXIS TRAMP: A six-engined Messerschmitt 323 transport being shot up near Corsica by Wing Cdr. W. Maydwell, D.S.O., D.F.C., who was flying a cannon-armed Marauder. Three of the Me's engines were put out of action and it turned to attempt a forced-landing on the island.

Italy Hammered

MILAN suffered its heaviest raid on the night of August 12th, when Bomber Command dropped over 1,000 tons of bombs in just 30 minutes. Turin was raided on the same night. Two nights later Lancasters visited Milan again, and paid special attention to the Breda works. The first raid cost us only seven bombers, and the second only one. On the intervening Friday General Doolittle in person led a force of 200 American bombers from the North African Strategic Air Force in a second attack on the marshalling yards at Rome. They dropped 500 tons of bombs and returned without loss. The Badoglio Government promptly declared the Capital an "open city," but deeds must follow words if that is to have any effect. It is a complicated question.

BRITISH & U.S. AIR LOSSES to AUG. 14th

	Over G.B. A'crft.	Continent B'brs.	Continent F'trs.	Middle East A'crft.	N.W. Africa A'crft.
Aug.					
8	0	1	0	0	2
9	0	9	3	0	3
10	0	16	0	0	5
11	0	1	1	0	1
12	0	7	0	0	0
13	0	0	0	0	4
14	0	1	0	0	3
	0	35	4	0	18

Totals: West, 7,101; Middle East, about 2,212; North West Africa, 1,025.

On the following night Liberators of the U.S. Ninth Air Force departed from their habit of day attacks and flew from Africa to an aircraft factory at Wiener Neustadt, only 27 miles to the south of Vienna. It was a mighty effort and involved a return trip of some 2,500 miles. This great feat must have given the Germans an exceptionally severe shock, for it struck at an area which had hitherto been thought safe from Allied attacks.

Mosquitoes from Britain have made several night raids on Berlin, which may not have been very destructive, but must bring home to the heart of Germany how the war is going.

Perhaps the most encouraging piece of news published during last week-end has been the heavy losses of the U-boats in the Atlantic. In the three months, May, June and July, no less than 90 of them were destroyed, and many more must have been damaged. Air power and sea power share the credit for this remarkable victory.

SWEDEN'S NEW AIR TRAFFIC COMPANY

THE Swedish air traffic company AB Aerotransport (A.B.A.), is well known in all the countries of Europe, and had a good reputation before the war. Their pilots are well trained and among the best in the world. The A.B.A. was the first company to introduce night flying in Europe, when they started their night post service. Thanks to this service, it was possible to post a letter in the evening in Stockholm and receive it the following morning in London.

Some few months after war broke out the A.B.A. began planning an Atlantic Line to the U.S.A. These plans were discussed with representatives from the Danish and Norwegian Air Lines, but the war events in April, 1940, made all traffic impossible across the Atlantic from the Northern countries. It has, however, been more and more evident that intercontinental air traffic is of great national interest to Sweden. The future of her trade and commerce depends on good connections with other continents. The Swedish Government has fully understood this fact and has now supported efforts to form a strong company for such a service.

Owing to the Swedish Government's policy, only one company was allowed to be formed; this company must also have an agreement with the A.B.A. The result is Svensk Interkontinental Lufttrafik A.B. (Swedish Intercontinental Air Traffic, Ltd.), called S.I.L.A., which will establish close co-operation with the A.B.A.

S.I.L.A. has been formed with an initial capital of ten million Swedish Crowns—i.e., £500,000. This sum has been subscribed by more than fifty Swedish companies, representing firms of shipowners, trade and commerce. The capital will later be increased to 30 million Sw. Cr.

The S.I.L.A. are to fly to other continents only; the European traffic and future Swedish inland lines will continue to be served by the A.B.A. The ground staff and pilots are all employed by the A.B.A., but according to the agreement the S.I.L.A. can utilise their services for a special fixed sum.

The manager of the S.I.L.A. is Mr. P. A. Norlin, formerly assistant manager in the A.B.A. Mr. Norlin is at present in the U.S.A., together with the technical expert, Mr. Karl Henrik Larsson, for discussions about the Atlantic Line. This line will be opened as soon as possible after hostilities are over, but it will probably not be the only line flown by the S.I.L.A. There are signs of the possibility of other lines, to Asia, Africa, Australia, and — above all — South America.

HERE AND THERE

Lancaster Airliners

CANADIAN NATIONAL RAILWAYS, it is learnt, is shortly to operate Avro Lancasters on a special airline service, particulars of which have not yet been announced.

The Lancasters will, obviously, be Canadian built, and it can also be assumed that they will differ in a number of respects from the bomber version now in production in the Dominion, but no details of these modifications have yet been released for publication.

Gibson of the Dams

A GOOD deal of interest has been aroused by the inclusion of Wing Cdr. G. P. Gibson, V.C., in Mr. Churchill's party visiting Canada.

Wing Cdr. Gibson was posted temporarily to the staff of Air Chief Marshal Sir Charles Portal, one of the three Service chiefs with the Prime Minister.

Royal Visitor

QUEEN MARY recently watched the plotting of an operation by Whirlwind bombers of Fighter Command. She was shown round the operations room at Group Headquarters by the Air Officer Commanding, Air Vice-Marshal C. R. Steele, D.F.C., and later, while taking tea in the officers' mess, she was given news of the Whirlwinds' success.

Turkey Releases U.S. Airmen

THE seven American airmen who had been interned in Turkey after their aircraft had crashed in the sea off the Turkish coast are to be released. The airmen were returning from the raid on the Ploesti oilfields when they crashed.

It can be said, according to international law, that these men were shipwrecked and took refuge in neutral waters.

Radio (dis) Location

IT is reported from Zurich that the R.A.F. are dropping a special device which gives out electro-magnetic waves and so interferes with the enemy's radio-location as it floats to earth.

NEW U.S. INSIGNIA: Here is the design of the new insignia for U.S. aircraft, introduced because the old one, with its red centre-spot, could be confused with the Japanese marking at a distance. The background is still blue, the five-pointed star and the rectangles white, and the whole device edged with a red band.

The device is a strip of material called "staniol," measuring 8in. by 1in. and coloured silver on one side and black on the other.

"Payload"

AN item in the B.B.C.'s Home Service programme on Sunday next should be worth listening to; it is a documentary drama entitled "Payload" and was first broadcast in Canada in 1940.

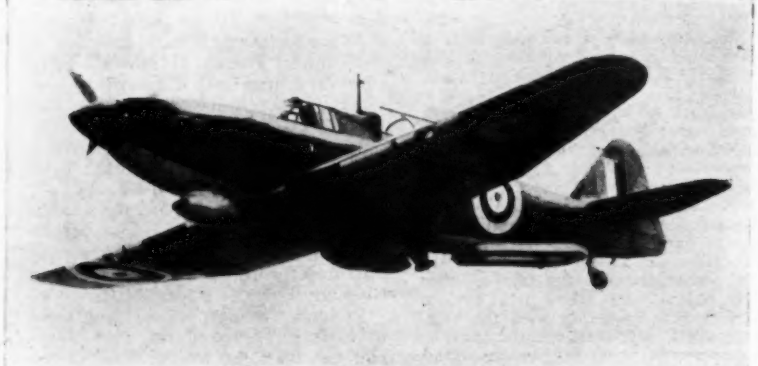
It deals with the difficulties, mainly from the weather, met by the air crews who helped to develop the mineral resources of the Dominion's north-western territory, taking such perilous cargoes as dynamite for the mining operations, and bringing back valuable freights like pitchblende, from which radium is extracted.

Recent Appointments

AIR VICE-MARSHAL C. E. H. MEDHURST has been appointed Commandant of the R.A.F. Staff College. The Air Vice-Marshal, who is 46 years of age, was Air Attaché in Rome between 1937 and 1940 and later became Director of Allied Air Co-operation.

* * *

SIR HENRY TIZARD is to leave England on special duties for two to three months and has resigned from the Air Council and the Aircraft Supply Council of the Ministry of Aircraft Production which he joined in 1941. He was, until recently, chairman of the Aeronautical Rsearch Committee.



HIGH SPEED TARGET TUG. The speeds at which aerial combats take place to-day call for plenty of speed in the drogue tugs used for training. The Defiant II is now being used, with the necessary modifications, for this important work. Its 1,280 h.p. Rolls-Royce Merlin XX engine gives it a top speed of 260 m.p.h. at 20,000ft. with drogue in tow.

Transatlantic Mosquitoes

DESCRIBED by Mr. Ralph P. Bell, the Canadian director-general of aircraft production, as "marking an epoch in the annals of the Canadian aircraft industry," the five de Havilland Mosquitoes which recently flew across the Atlantic for operational duties in this country were christened at the de Havilland airport, near Toronto, before they left for Great Britain.

Brought over by R.C.A.F. and R.A.F. Air Transport Command crews, the five "Mossies" were the first frontline combat aircraft built in Canada to be flown direct from Canada to the main theatre of war, and they were named after the five Canadian towns which had topped the list in a "victory loan" contest, namely, New Glasgow, Action, Moose Jaw, and Saskatoon.

Arctic Route

AS is usual when a new type is brought over for the first time, the first batch came via Greenland and Iceland to give the ground crews some idea of handling them and what equipment they will need. It was, therefore, quite a leisurely trip, the total mileage from the Canadian factory to their destination in Britain being just over 3,000 miles.

Twenty-two-year-old F/O. J. G. Euren, who, partnered by F/O. R. C. Bevington, was in command of one of the first two Mosquitoes to arrive here, said it was the first Canadian-built aircraft he had flown across the Atlantic, and although he expected some snags with a new type on the Atlantic route, there had been none.

The aircraft was very stable, the Merlin engines delightfully smooth, and they were able to take sextant readings quite comfortably. All the hops were done in daylight, with only two hours' blind flying, and, apart from the fact that a "Mossie" is a bit cramped for very long journeys, he had no adverse criticisms.

A Russian Fighter

THE detailed review of the Lagg-3 which appeared in the last issue of *Flight* was based upon a translation provided by the Ministry of Aircraft Production (R.T.P.), mainly from *Flyg*, Sweden.

Features of the Lagg fighter are wood construction and comparatively light flying weight (7,056 lb.). It mounts a V-type 12-cyl. engine of 36 litres, the specific weight being as low as 1.15 lb./h.p. and the power 32 h.p./litre.

Italy's Air Power

Steadily on the Down-grade : The Burden of Pre-war Adventures : Deficiency of Raw Materials : Strained Production

By V. L. GRUBERG

AS yet it is premature to include the *Regia Aeronautica* in an obituary of Italy's African Empire and her island outposts. But while the Empire has disappeared, the climax in the critical condition of Italy's air power is rapidly approaching, and symptoms of its waning strength and progressive weakness have been apparent for some time.

The *Regia Aeronautica* was founded on March 28th, 1923, and during the twenty years since its inception it has taken part in different ventures of the Duce and has been continuously built up. The first major operation of the Italian Air Force was in the war against Abyssinia, and after a short interval the second followed in the form of Italian interference in the Spanish civil war.

It might have been thought that such experimental experience would have resulted in the improvement of equipment and in the accretion of operational skill of the *Regia*. But in reality it produced no dividends.

Miscalculated

Brig.-Gen. Giuseppe Barba, Inspector-General of the *Regia's* fighter units, declared recently: "To be sure, the Italian Air Force entered the new world war rich with the experience of two victorious campaigns, but on the other hand it suffered heavy material losses, and has been robbed of the opportunities to exploit this war experience with the same intensity as other nations not involved in military complications during the last years of peace."

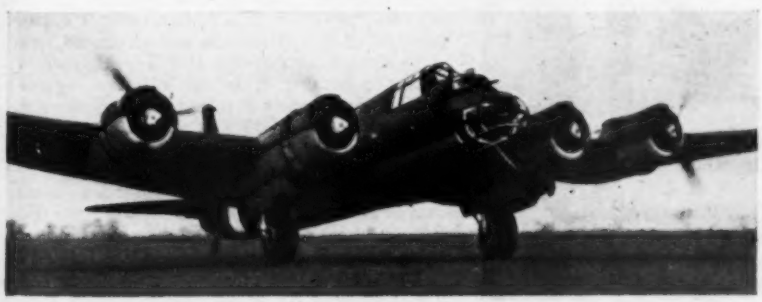
That the *Regia* did not profit from the Spanish laboratory is yet another proof of the inherent weakness looming behind the impressive decorum on the Fascist stage. And since air power cannot be built up with the splendour of impressive decorations but only by a tremendous expenditure of material, tools and industrial resources, sooner or later the bleak truth had to come out: Italy was incapable of keeping pace with the development of aircraft production of other nations. To quote again the Italian Brigadier: "While, during the 1914 war and shortly afterwards, one might have believed that light construction,

The S.M. 84 torpedo-bomber developed from the S.M. 79 has a span of 69ft. 9in. and a length of 58ft. 9in. Powered with three 750 h.p. Alfa-Romeo 12RC34 air-cooled radial engines, the aircraft has a top speed of about 260 m.p.h. at 12,500ft., carries two torpedoes, and features an upper gun turret. Note the new twin tail arrangement.

simplicity of equipment, and engine performance predestined the air force to become *the* weapon of the 'have-nots,' this idea has since been rapidly and profoundly refuted by aerodynamic progress and construction, and by improvements in engine output. In the course of this development the aircraft industry has risen to towering heights in its national importance, and overshadows almost all other branches of the industry. In the construction of aircraft Italy was then facing yet another difficulty, arising out of her poverty in raw materials: each development was hampered by the necessity to import practically all materials essentially wanted by the industry."

In 1936 Italy's capacity to provide herself with essential raw materials did not exceed 37.1 per cent. for iron and steel; 14.2 per cent. for manganese ore; 3.2 per cent. for copper; 0.7 per cent. for mineral oil. All her rubber, chromium, tin and wolfram had to be imported. By 1939 her production of strategic materials was still extremely modest; her share in the world's production of iron ore was not more than 0.7 per cent.; of coal 0.1 per cent.; of bauxite 8.7 per cent., and of manganese ore 0.4 per cent. In the whole of 1937 Italy produced only as much coal as Great Britain in two days, and even the planned output for 1941 equalled British production of one week only.

It can be assumed that some of Germany's spoils of Europe have been diverted to Italy, and that an exchange of goods keeps her supplied to some extent with the required raw materials. But since Germany is



SOLE EXAMPLE : The only four-engined Italian bomber is the Piaggio P.108, a military version of the civil prototype. It is powered with four Piaggio P. XII RC.35 radial engines of 1,350 h.p., has a maximum speed of 290 m.p.h., and is equipped with a pressure cabin.

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primarily concerned with keeping her own war machine going, the inter-Axis supply could not materially alter Italy's fundamental weakness.

Under the direction of the *Comitato Interministeriale per l'Autarchia* (Inter-Ministerial Committee for Autarchy) strenuous and reasonably successful efforts were made to improve the production of indigenous war materials. In the field of light alloys the *Istituto Sperimentale dei Metalli Legheri*, established in 1941 in Novarra, was of great value. The development of new steels and alloys resulted in considerable savings in the requirements of such scarce metals as antimony, tungsten, nickel and copper, but since substitutes could not be found for some of the essential materials, it is of interest to survey briefly Italy's position in relation to their supplies.

The Drive for Self-sufficiency

While recent reports indicate a shortage of copper, Italy should be relatively well off in the supply of magnesium. In 1938 her domestic output of this material, necessary for the production of duralumin and similar alloys, amounted only to about 200 tons, but this has since been considerably increased, mainly by German supplies.

For the supply of rubber Italy is again dependent on the goodwill of Germany. Of the two local plants built for the manufacture of synthetic rubber by the *S.A. Industria Gomma Sintetica*, only one is said to be in actual operation, using alcohol as basic material, while the second plant, which is about to start production, is to employ a calcium carbide process.

In the production of bauxite and aluminium the Montecatini concern developed a thorough exploitation of the bauxite resources of Gorgano, expanded the aluminium works at Mori and, in 1942, announced the building of a third plant in Bozen (S. Tyrol). It also undertook the construction of a new smelter, and the completion of a new plant for the artificial production of cryolite. Simultaneously, increased attention was paid to the Yugoslav bauxite resources, but 96.6 per cent. of their exports go to Germany. The only Italian-controlled aluminium plant in Yugoslavia is at Lovats, and has an output of not more than 2,000 tons per annum.

Italy's yearly bauxite production amounts to about 361,000 tons, and since four tons of bauxite are required to produce one ton of aluminium, it should have been possible to produce 90,000 tons of aluminium. But since vast quantities of electric energy are involved in the process (20,000 kWh are consumed for each ton of aluminium produced) efforts were made to increase the hydro electric power supply. By 1941 it amounted to 19.1 mld.kWh (19,000,000,000), but the utilisation of this power (which is, in the absence of coal, the main source of energy supply) for industrial purposes has been rather slow.

The aircraft industry embraces to-day some sixty-three major establishments, most of them controlled by one or other of the leading firms, such as Fiat, Caproni, Savoia, until recently organised in the *Gruppo Costruttori Aeronautical Italiani*. Engine production is entirely concentrated in the hands of four companies, the Fiat, Isotta Fraschini, Piaggio and the Alfa-Romeo.

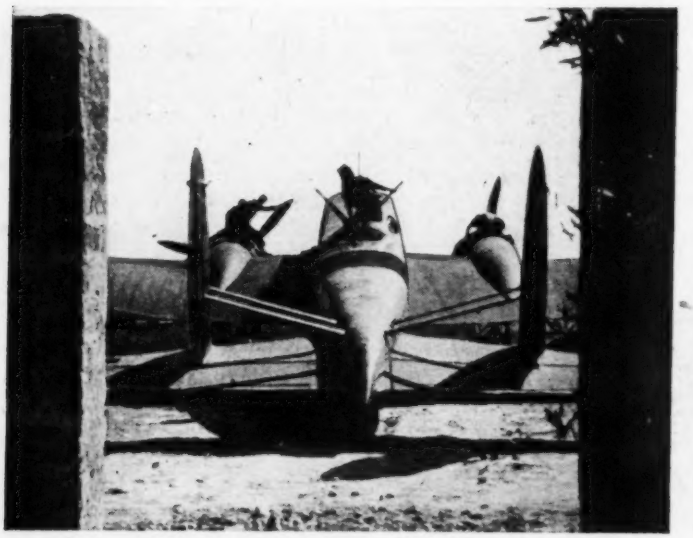
Already before the war the limitation of metal supplies had enforced the adoption of mixed construction. Out of a total of about forty-nine types developed in recent years, twenty-nine are of mixed or non-metallic construction.

Before the tightening up of measures for self-sufficiency in war materials, Canadian spruce and red poplar from Finland were standard materials. Welding steel was not produced in Italy and had to be imported from Sweden, Austria and America, and the same applied to alloy steels. Duralumin was produced only in small quantities, and had to be purchased in Germany, Switzerland and France.

New Materials and Types

The materials used at present by the aircraft industry comprise locally manufactured duralumin from domestic bauxite, but still relying on imported copper. Spruce was replaced by red poplar from Friule, but only specially selected wood could be used, since it is not as free from knots as spruce. More important in the general practice is the employment of processed and resin-bonded wood, for which local birch, beech and poplar are being used. In the field of alloy steels the chrome molybdenum variety had to be given up, and manganese steel and other compositions of more readily available metals adopted.

Constantly pressed to fill in the gaps in the Air Force strength, the industry fell behind other powers. Despite a radical reduction in prototype development time, the need for substitute development, for urgent replacements and the limitations of productive capacity enforced the concentration on established types, thus renouncing the expenditure of labour, plant and time for the development of new types. These circumstances are mainly responsible for the creation of relatively few new types since the war.



THE STORK: Fiat B.R.20 "Cicogna" bomber, powered with two Fiat A.80RC.41 18-cyl. air-cooled radials of 1,000 h.p. each, has a speed of 268 m.p.h. at 16,400ft., and armament includes an upper turret with two 12.7 mm. M.G.s.

The fighter production, which is now probably being given priority, has two new types to its credit, the Macchi C 202 and the Reggiane 2001. Both are reported to be now in quantity production, but their armament and performance lag behind British, U.S.A., Russian and German fighters.

Incidentally, the Italian journal *La Via dell'Aria* reported that a dive-bomber type is in development, based on the Breda 88 twin-engined bomber and the Reggiane Re 2000.

In the bomber class the only four-engined type is the Piaggio P.108 (a military development of the Piaggio P 108C commercial airliner), powered with Piaggio XII RC 35 air-cooled radials of 1,350 h.p. each.

Italy's medium and light bombers are the Savoia-Marchetti SM 79 and SM 84; the Fiat BR 20; the Cant Z 1007, Z 1007 bis and the more recent Cant Z 1008.

The Cant Z 1008, powered with three 1,000 h.p. Piaggio PXI RC 40 radial engines, has a span of 81ft. 4in., a length of 60ft. 6in., and height of 17ft. 1in. It has a loaded weight of approximately 30,000 lb. and a maximum speed of about 265 m.p.h. at 13,000ft. The

Cant Z 1007 bis, designed for long-range bombing, and powered with the same engines, is credited with a higher speed, and carries a bomb load of 2,640 lb. The aircraft has a normal flying weight of 28,600 lb. and a service ceiling of 26,500ft. It is armed with one 12.7 mm. gun in a dorsal turret, one 12.77 mm. gun in a ventral turret, and two 7.7 mm. lateral guns. Range is 800 miles and endurance 3.4 hours.

Even in the seaplane class which, in the complete absence of aircraft carriers, forms the mainstay of Italian operations in the Mediterranean, nothing new has been developed since the Cant Z 506B "Airone" torpedo-bomber, the representative type, which goes back to 1937, and which in its latest reincarnation has a maximum speed of 251 m.p.h. at 13,000ft., a loaded weight of 27,100 lb., and an endurance of 5 hours.

Finally, torpedo bombers are still represented by the Savoia-Marchetti SM 79 and SM 84, although, according to recent Italian reports, new types were expected.

The aircraft engine industry, which in peacetime produced a number of thoroughbreds, is equally strained by the difficulties of wartime demands. Here again raw materials are a constant handicap and the assistance of Germany is of vital necessity. At a general meeting of the Fiat Company in March, 1942, the Managing Director, Prof. Vittorio Valletta, revealed this situation in the following words: "As a result of special agreements and an ever-close collaboration of the Fiat group with German industrial circles, and due to the efforts made by the competent authorities, the difficulties in the procurement of raw materials were overcome." That in reality this collaboration was somewhat one-sided, and that the difficulties continued, is indicated by the fact that German Daimler-Benz engines were installed in the latest Macchi C 202 and Reggiane fighters, and secondly by the production of three-engined bombers to the exclusion of four-engined types.

Needless to say, no official figures of the production capacity have been disclosed since the war, but it may be of interest to attempt to gauge it on a basis of other available data.

The labour force in the aircraft industry increased from 2,150 in 1934 to 7,500 in 1935, and to 58,000 in 1938, as stated at the time by Mussolini. It may be estimated that out of a total of 810,000 workers reported (*Neues Wiener Tagblatt*, 4.8.'42) to be employed in 1940 in the mechanical industry, a maximum of 250,000 are in the aircraft industry.

A German estimate suggests that 60,000 man-hours are necessary for the production of one fighter and 150,000 man-hours for one bomber. Assuming that 30 per cent. of Italy's production is devoted to bombers, 40 per cent. to fighters, and the balance to other types, the above labour force could produce monthly 120 bombers, 400 fighters, and 120 other aircraft at ten hours per day and a six-day week.

AXIS BRED : The Macchi C.202 single-seater fighter is powered with a German Daimler-Benz D.B.601N 12-cyl. liquid-cooled engine of 1,200 h.p. and has a maximum speed of 330 m.p.h. at 18,000ft. Only two 12.7 mm. M G.s are carried.

It has also been estimated that of the finished weight of the average military aircraft, aluminium comprises 69 per cent. of the weight of the airframe, 23 per cent. of the dry engine, and 24 per cent. of the airscrew weight. Taking as a basis for this estimate the representative types of Italian aircraft and engines, it would appear that about 48,000 tons of aluminium would be required in one year to keep up an aircraft output of the dimensions calculated above.

The Vicious Circle

On the surface these figures may appear to be within Italy's capacity. But other factors, such as the problem of machine-tool and alloy production, should not be overlooked. Moreover, for the production of this quantity of aluminium some 960,000,000 kWh of electric power would be required. This figure already represents about 60 per cent. of the total industrial hydro-electric power consumption, and the variations in this supply due to seasonal conditions should be kept in mind. From different decrees issued in the past two years and restricting the consumption of industrial hydro-electric power (except in the production of aluminium and other metals) it is evident that Italy's main source of power is being worked to capacity.

It would therefore appear that this estimate of production output represents rather the optimum of Italy's capacity. Incidentally, it can be assumed that, since only half of the aluminium production goes to the aircraft industry, a good proportion of the balance is taken by Germany in barter for such supplies as she delivers to Italy.

But perhaps the most acute deficiency in Italy's air power is the

ALL ITALIAN : The Reggiane Re.2000 single-seater fighter is powered with a Piaggio P.XI RC.40 radial of 1,000 h.p. Further versions designated Re.2001 have been equipped with the same engine as the Macchi C.202.

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supply of fuel. Before the war practically all her requirements had to be covered by imports. To foster domestic production the A.G.I.P. (*Azienda Generale Italiana Petroli*) was formed. In 1941 it was entrusted with the control of all fuel supplies, research and the administration of about twenty-four enemy enterprises which had either depots or refineries in Italy.

Rumania is at present Italy's main source of supply of natural fuel oil. The resources of Albania (near Valona, in the Vojussa Valley, and in the area of the rivers Osum-Devoli) operated by the A I.P.A. (*Azienda Italiana Petroli Albanesi*) have been consistently expanded, and in 1938 their annual output amounted to 127,000 tons. Experimental drilling in the Po Valley, in Apulia, Sicily, Latium and Abruzzi gave no results.

Fuel Shortage

The development of large-scale synthetic fuel production was impeded by the lack of adequate coal supplies. The A.N.I.C., a Government-controlled parent company, operates refineries in Novara, Bari, Leghorn and Naples. Early this year it was announced that the hydrogenation plant originally built for the production of automotive fuels had been improved for the manufacture of high-grade aviation fuel and lubricants. But since R.A.F. Bomber Command has paid due attention to these centres it can safely be assumed that that report is by now out of date.

The expedient of effecting savings in the general petrol consumption by switching a part of it over to producer gas is handicapped by the lack of adequate timber and coal supplies. In this tangle of difficulties the only readily available "Ersatz" was found in methane gas. Endeavours were made to utilise this for industry, and recently Milan was connected by a pipeline with the main source of supply at Piacenza.

Plans have also been adopted for the exploitation of methane gas from city drainage systems. But all these schemes remain within the domain of the future, while the present actual output of methane gas does not exceed 60,000,000 cu. m. per annum, representing a saving of only 78,000 tons of petrol.

This shortage of fuel, although not critical hitherto, is undoubtedly the most sensitive spot in Italy's armour, and potentially the most dangerous to the survival of the operational power of Italy's Air Force. Lying, as Italy does, under a criss-cross of Allied air ranges, the question of fuels and lubricants must have a paralysing effect on Italy's war machine.

In addition to the weakness caused by lack of materials, Italy's air strength is seriously impaired by the unfavourable locational distribution of the aircraft industry. Since only few parts of Italy are more than forty miles distant from the sea, and no real hinterland is available for strategical dispersal, the vulnerability of aircraft plants has been a constant source of worry to the Fascist Government. The most important aircraft works are in the north (Milan, Sesto-Calende, Varese, Turin, Pisa, etc.), but their close proximity to the French border was considered to be too dangerous, even before the war. Ever since Mussolini in the summer of 1937 declared Sicily "the centre of gravity of the Italian World Empire," attempts have been made to move the industry more to the south. In 1938 plans were adopted for the transfer of plants to, and erection of new ones in the vicinity of, Rome and the south.

With the change in the strategic situation, caused by the Allied domination of North African air bases, this problem has acquired the dimensions of a predicament. It appears that in these circumstances the senior partner of the Axis had decided to move some precious equipment—lock, stock and barrel—to some safer regions, as illustrated by the recently reported transfer of Fiat plants away from Italy.

And what of the *Regia*? "When I think," answers General Fougier, until recently the C.-in-C. of the *Regia*, "that our Air Force had, for three years following the wear and tear of preceding wars, to oppose an enemy abundantly provided with aircraft, there is reason to be proud of what has been done." But, setting sentiment aside, the facts are that during these fatal three years the *Regia* has suffered severe losses. Its man-power has been depleted by the loss of 12,500 men, of whom 2,000 were officers. In addition, since feverish preparations were necessary to make up for losses, training had been accelerated and the accident rate was rather high. Seven hundred officers and about 3,000 N.C.O.s were killed or wounded as the result of flying accidents during the "feverish preparations for ensuring the efficiency of the Air Force." (Official Italian Report, 14.5.43.)

An Italian Prediction

With the intensification of air warfare in the Mediterranean war zone the depletion of cadres continued unabated, and with the increased calls upon the Air Force, and the corresponding acceleration of training, the accident rate has, if anything, remained the same.

Nothing can illustrate better the future fate of the *Regia* than a frank statement by Italy's Under-Secretary for the Navy, dealing with the Air: "We do not possess the forces we would like to have to meet possible attacks." And the Chief of the *Regia* went right to the core of the matter when, in the recent deliberations on the budget estimates, he declared: *"The war in the air is merciless against old material."*

A HARMLESS VARIETY : One of the de Havilland civil Mosquitoes now in service with British Overseas Airways for urgent communications about to take off on a night journey.

Behind the Lines

Service and Industrial News from the Inside of Axis and Enemy-occupied Countries

Airborne

A GERMAN correspondent states that, apart from numerous brigades of tanks, the Russians are also employing many divisions of airborne troops in their present operations.

Change-over

TO enable him to devote himself entirely to his duties as military C.-in-C. in Holland, *Luftwaffe* General Christiansen has been relieved of the command of the Nazi Party Air Corps.

His successor is Col. Gen. Keller, also a veteran of the last war, who in this war commanded an Air Fleet on the Russian front.

Research

INTERAVIA reports that the German Scientific Institute for air transport (*Verkehrswissenschaftliches Institut fuer Luftfahrt*), the activities of which were curtailed at the beginning of the war, has since resumed a limited working programme. Under the leadership of Prof. Pirath, observations gathered by the Institute, it is said, have again illustrated the great adaptability of commercial air services to radically changed political and economic conditions, and to their rôle as a strategic reserve. Among other subjects, the Institute is studying the possibilities of *peacetime employment possibilities of glider trains* and post-war problems of competition between aircraft and surface transport.

Luftwaffe Engineers

AN appeal for volunteers for commissioned ranks in the *Luftwaffe* Engineering Branch gives some details of the selection and method of training. Those eligible are young men born in 1926 and 1927 who have attained a matriculation standard of education and have adequate mathematical or scientific knowledge to enable them to take up academic studies. Alternatively, graduates of secondary trade schools and engineering colleges are equally eligible.

Selected candidates are first given general military and flying training, the same as pilots of the *Luftwaffe*, and are subsequently posted with the rank of lieutenant to operational units for flying duties. Only after having acquired this experience do they begin with the practical and theoretical engineering training.

Jap Alloy

A JAPANESE rust-resisting light alloy, produced by Prof. Abinata, of the Bendai University, is said to have excellent elastic quality and a specific weight lower by 33 per cent. than that of Duralumin.

German Views

IN a study of the employment of air forces in support of landing operations, the *Militaerische Korrespondenz aus Deutschland*, a leading military journal, gives the following views based on the Allied invasion of Sicily.

"Apart from other considerations (it says) such as coastal configurations, possibilities for operational deployment, etc., a large-scale landing is restricted to areas where fighter protection can be provided. Although such protection may be given everywhere by ship-borne aircraft, it is only sufficient if the coast on which the landing is to take place is defended by relatively weak air formations, otherwise adequate protection for the landing fleet must be given by land-based aircraft, and the range limitations of such aircraft limit the attacker in choice of his landing place.

"*In the case of Sicily it could therefore be predicted that the Allied forces would probably choose their landings on the western extremity of the island or in its south-eastern corner.*

"In a landing operation the attacker can hardly do without strong air formations. To smash and keep down the defences by naval forces alone would be doubtful of success. In any case, the attacker needs aircraft in lieu of heavy weapons which go with the first landing waves only in limited quantity. The necessary fire protection for the actual landing operations can best be provided by bomber formations, but ground attacking aircraft and fighters are also useful. Above all, the landing fleet must be protected throughout the day by fighters against enemy bombers and torpedo aircraft.

"The effectiveness of air force formations employed as defence against landings depends on many factors, primarily on how much fighter protection the attacker can give to his naval units, whether he is capable of avoiding time lags in the fighter protection, and whether the weather favours or impedes attacks on sea targets. A landing operation against a coast protected from the air necessarily involves casualties, for a complete protection of the landing fleet is impossible and some air attacks of the defender will be effective."

In conclusion, the article observes that once the attacker has successfully concluded his landing operation proper, his weak spot is the supply route and it is here that the defender has a chance to strike back.

Krupps

DR. GUSTAV KRUPP VON BOHLEN UND HALBACH, chairman and managing director of all works of the Friedr. Krupp A.G., the leading German armament concern, has resigned in favour of his son, Alfred Krupp von Bohlen, retaining only the chairmanship of the board.

The deputy-chairman of the company is Prof. Dr. Paul Goerens, who retains the management of the Krupp steel foundry, and other board members are: Dr. Friedrich Janssen; Dr. Ing. Fritz Mueller, a mine director; Prof. Dr. Eduard Houdremoul, member of the German Academy for Aeronautical Research; and Prof. Dr. Erich Mueller, a well-known German armament designer.

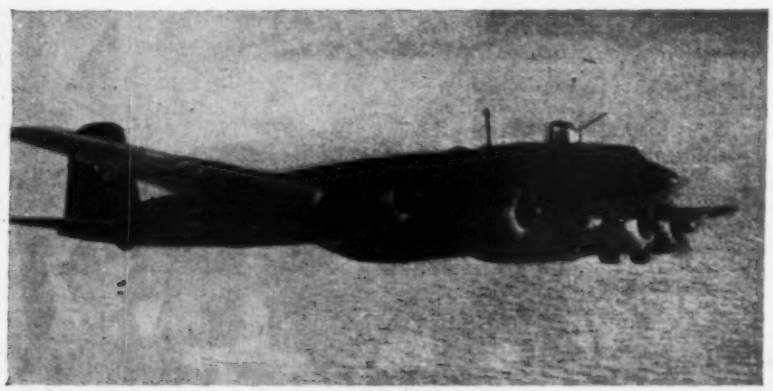
Migration

THE spreading of internal chaos caused by the R.A.F. raids is best illustrated by a reliable neutral report saying that at least 4,000,000 people have been evacuated from Western and North-Western Germany. The same source states that further millions are still awaiting evacuation.

Another neutral traveller, just returned from Germany, says that it cannot be concealed that during the past year the labour productivity has effectively fallen off by approximately 15 per cent. and that this drop in production is to be made up by the increased employment of women.

From Japan

THE Mitsubishi armament concern is to take up the production of duralumin for the aircraft industry. A large plant is to be established for this purpose in the province of Niigata.



CONVOY RAIDER: The Focke-Wulf Fw 200C (Condor), powered with four Brams "Fafnir" 940 h.p. radials, is heavily armoured and carries a bomb load of 6,600 lb. Two turrets, one above the cockpit and the other near the tail, and two gun positions in the bomb bay, comprise the armament.

Sicilian Invasion

Royal Air Force Servicing Commandos Prepare Airfields in Sicily in Record Time : Nearly a Thousand Enemy Aircraft Found on Captured Airfields

3. Inspecting a burnt-out enemy aircraft (Junkers Ju 88) on Comiso airfield. This was one of the airfields bombed out of action before the landing took place.

1. Men of the R.A.F. servicing commandos on the sandy Sicilian beaches. In the background can be seen some of the three thousand sea-going craft used for the invasion. The vehicle on the shore belongs to a signals unit whose job was to maintain communication.

2. An R.A.F. field signals unit established on an improvised airfield. The absence of steel helmets as the "rig of the day," as the navy would call it, proves the air superiority enjoyed by our forces.

4. On a Sicilian airfield shortly after it had been abandoned by the Axis. Testing and repairing radio equipment in a trench while a Spitfire V taxies out to take off.

5. *En route* for the "soft belly." R.A.F. transport and service vehicles approaching Sicily on a landing craft. An incredible number of vehicles of all types are required by an invading airforce. These may be any kind from ordinary lorries and petrol wagons to water-purifying units and caterpillar-Bulldozers

6. Change of ownership: Unloading supply lorries on Comiso airfield after the Axis had moved out and left it to our forces. On the left can be seen the remains of burnt-out enemy aircraft.

7. The tail of a Reggiane 2001 captured almost intact. The parking struts to stop the rudder swinging in the wind are still in place.

Topics of the Day

More Misconceptions

Old Wives' Tales of the Air : The Unimportance of Relative Motion : Visual Impressions and Automatic Reflexes : An Analysis of a Cross-wind Landing

IT seems to be in the very nature of the human animal to invent strange stories—or strange explanations of known facts—and then to believe them through generations, even to the point that the believers are ready to die rather than deny them. One can think of dozens of simple domestic beliefs which are still held by people who should know better.

I should probably be treading dangerously on the believers' toes if I recounted any of those I can think of at this very moment—old wives' tales that have persisted through generations. Some of them—like the business of astrology—may have some explicable basis of truth, but have been distorted out of all possible recognition; others are just plain nonsense—like the commonly held belief that children are physically affected by the mental shocks suffered by the mother before birth. You know the old story of the mother being frightened by a wolf and giving birth to a wolf-like child. Obviously, the child always *was* going to be an oddity, and the mother thinks afterwards of some good reason why such a terrible thing should have happened to her.

And flying people are like all the rest of mankind. Most of them understand the facts of aerodynamics as little as the average person understands the workings of themselves and the universe in which they live, so they produce Gremlinesque explanations of quite simple things. They even invent pseudo aerodynamic reactions in order to justify their various beliefs. I've already written at boring length of the strange ideas held by non-flying people about the operation and effects of constant-speed airscrews and about the peculiarities of trim or the effects of the controls. It is sometimes almost impossible to convince the great mass of the misled by the most careful arguments and expositions; the misled merely go back to their original hypothesis. Probably the worst of all are engineers who are well up in the subject and who, consequently, know they are right and will not listen to the mere pilot.

One of the nicest examples of the flying man's misconceptions is that concerning up-wind or down-wind turns. The new generation may not remember the days when it was considered to be the most dangerous thing in the world to turn down-wind after an engine had stopped, or without the most monumental supply of speed. Certainly, people were killed like ninepins in the old days from just such an apparent cause. The error lay in the reasons given for the phenomenon—reasons involving relative changes of ground speed and all that sort of thing.

Down-wind Turns

The best way to deal with the down-wind heretics (or reactionaries?) is to produce two extreme examples for them to think out for themselves. One is the case of the sixty-mile-an-hour machine turning down a sixty-mile-an-hour wind, and the other that of a motor boat moving in circles while on a very swift, smooth river. In the first case the blessed thing would, according to the down-wind exponents, fall smartly out of the sky as it turned; in the second the boat would momentarily lose steerage way as it turned down-stream. In fact, if you placed the aircraft above low-flying fog bank and the motor boat in a fog dense enough to hide the banks, the driver of neither would have any idea whether he was down, up, or across stream or wind. Each is an object floating in a medium separate from the earth, and is entirely unaffected by its motion relative to the earth.

Of course, there *are* slight differences, as the sailplane fellows will tell you. The structure of the bumps probably varies according to whether the aircraft is flying up or down wind, and a blindfolded yachtsman will be able to tell whether his vessel has a following sea or not. I am stipulating ideal conditions; in an aircraft one would naturally take special precautions if the wind was very rough and gusty near the ground.

I'm afraid that the causes of the number of down-wind-turn accidents in the old days, when engines tended to stop, must be looked for elsewhere. Most of them were caused by the very nearness of the earth, which not only upset the pilot's judgment in his execution of the turn, but which also tended to make him raise the nose in an instinctive endeavour to stay in the sky at all costs.

Weathercocking

Another misconception of a similar nature is the idea, held by quite experienced pilots, that an aircraft tends to turn itself into wind while still in the air, and particularly when near the ground. Once again, the aircraft is entirely separate, and has, until it touches the ground, no axis round which it *can* weathercock. If time and circumstances permitted, and if it was worth the expense and trouble, I'd like to put these pilots under the hood of a slow aircraft (slow, because the weathercocking tendency, if any, would be so much greater) and fly them in a screeching gale at low altitude, altering the course on each run. I would be prepared to bet a very satisfactory sum of money that my hooded friends would be quite unable to tell whether the thing was flying across wind on any particular run, either by instruments or by feel. Of course, if we flew *very* near the ground in gusty conditions, they might be able to tell something from the lateral motion, which would be affected by the "bump structures"; but I would be prepared to risk that.

One or two pretty explanations could be thought out if this weathercocking was in any way a fact; these same "gust structures" (I can think of no better word to describe what I mean) might possibly affect the aircraft near the ground. Though flying squarely into its own wind (as any good flying machine, by its very nature, must do if left to itself), the up-currents may be steeper on one side than the other, and these vertical disturbances might cause a more pronounced yaw to the windward side. But, as I've said before, ideal conditions must be assumed for the sake of argument; the fellows I am getting at are not those who claim that it happens, though they "can't say why," but those who think that the aircraft is behaving like any fixed weather vane or like an anchored barrage balloon.

Except possibly in very rough and gusty conditions I deny that there is any such tendency. Certainly, I've never noticed it. But it is easy enough to see how such an impression can be gained, and how a very experienced and instinctive pilot will actually *make* the yaw for himself and think that the aircraft is doing it for him. Long practice and experience have made the pilot feel deeply unhappy and even physically uncomfortable if, when approaching to land, the ground is not coming up quite straight towards him. Early experiences with accidental drift landings has conditioned him to that horror. So, without really knowing that he's doing anything at all, he corrects the drift feeling by turning the aircraft more into wind; he finds, of course, that such a correction (instinctively carried out)

MORE MISCONCEPTIONS

takes him off his line of runway approach, so he turns back again with a much more conscious and thought-out correction. He remembers the re-correction, but *not* the quite instinctive initial yaw into wind.

Another interesting thing happens as he holds off along the cross-wind runway. By now the aircraft is moving in a most pronounced crabwise fashion relative to the ground; such a movement neither looks nor feels right, so the pilot tried to straighten up with a touch of rudder just before the landing. That jab of rudder brings the aircraft square with the runway and also gives it a momentary skid in the opposite direction, thus partially cancelling out the drift and making the landing almost comfortable. I've often wondered why an approach with a seemingly wrecking amount of drift ends up with a fairly normal landing, and I've actually watched myself in a quite impersonal sort of way apply that rudder. I don't say that the corrective skid is at all pronounced, or that it is more than half the story; the other half is the fact that inertia takes a hand. At one moment the aircraft is going straight down the runway, but the nose is pointing, say, twenty degrees off the line, the next application of rudder brings the nose round and the aircraft hasn't had time to move out of its original course (down the runway) before the landing has been completed.

Somebody recently asked about the effect on general control of a dihedral tailplane with fins and rudders set at right angles to each section of the tailplane. Since rudder and elevators change their respective jobs gradually as a turn is increased in steepness, wouldn't it make it rather difficult for the pilot? In fact, of course, the two controls do *not* change their functions at any time as far as the aircraft is concerned—and that is what really matters.

The pilot would probably notice very little, since, as I've said, the work done by the two controls remains the same in any position of the aircraft. The only difficulty might be one of area, since the rudders might not be effective enough to hold the nose up in a steep turn, and the elevators might be a trifle soggy, but in a turn the pilot would notice only the effect of the controls as they were used together, and would find it almost impossible to distinguish the relative value of each. In a forty-five degree turn, for instance, the weakness of the elevator as a "nose-raiser" would be balanced by the greater power of the rudder in this respect, but, in fact, the controls would continue to do the same work, and any weakness would be just as discoverable in level flight. The pilot's reactions and motions are too complicated and instinctive in a steep turn for him to distinguish clearly the different components.

Unless a definite vice appears, the ordinarily good pilot doesn't care whether more or less elevator or rudder is required at any stage of an evolution—he just gets on with it. For instance, certain aircraft nowadays tend to build up their own turns, and forward pressure has to be applied to the control column in order to prevent the turn from becoming too tight for comfort or efficiency. Yet dozens of pilots have probably never noticed the characteristic, so reflex have been their corrective movements, and are probably quite surprised when a works test pilot tells them why the aircraft behaves in that particular way; they honestly hadn't noticed any peculiarity.

One can multiply examples of this sort of thing *ad infinitum*, but I think I've said quite enough.

"INDICATOR."

A.T.A. BENEVOLENT FUND

FURTHER donations to the Benevolent Fund of the Air Transport Auxiliary have to be acknowledged. With the subscriptions listed below, the total amount received is £8,035 11s. 7d., which, added to contributions of members of the A.T.A. and B.O.A.C., gives a sum of £10,801 9s. 2d.

Donations should be addressed to the Secretary, A.T.A. Headquarters, White Waltham Aerodrome, near Maidenhead, Berks.

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Sixty-second of the Latest Recognition Series

Aircraft Types and

HEINKEL He 115

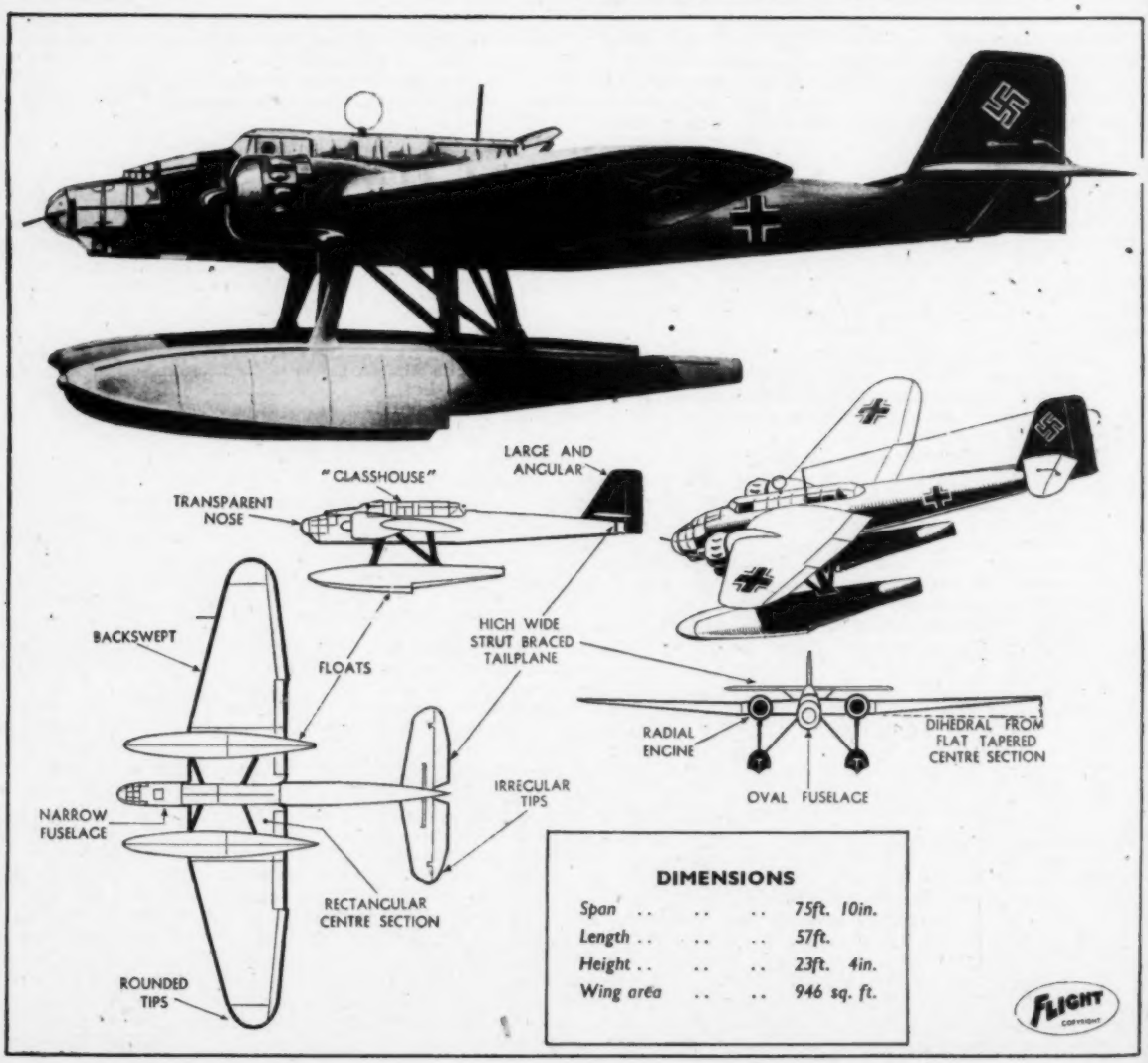
As the first type of aircraft adapted by the Germans for the sowing of their magnetic mines, the Heinkel He 115 floatplane can claim a certain distinction. It began life before the war as a civil aircraft, in which guise it set up a number of records of the load/range kind, and the military version rather significantly went into full-scale production towards the end of 1939.

As a reconnaissance, torpedo-carrying, mine-laying seaplane, the He 115 soon proved itself to be an extremely useful aircraft in air-sea operations, and has seen extensive service, especially against Allied shipping in the North Sea.

The first production models of the He 115 had shorter noses than the current version illustrated here, and it is unlikely that any of these are still in service. In overall dimensions the long-nosed He 115 approximates to its land-based stable companion, the He 111 bomber, but even apart from the twin floats, there is little resemblance in outline between the two.

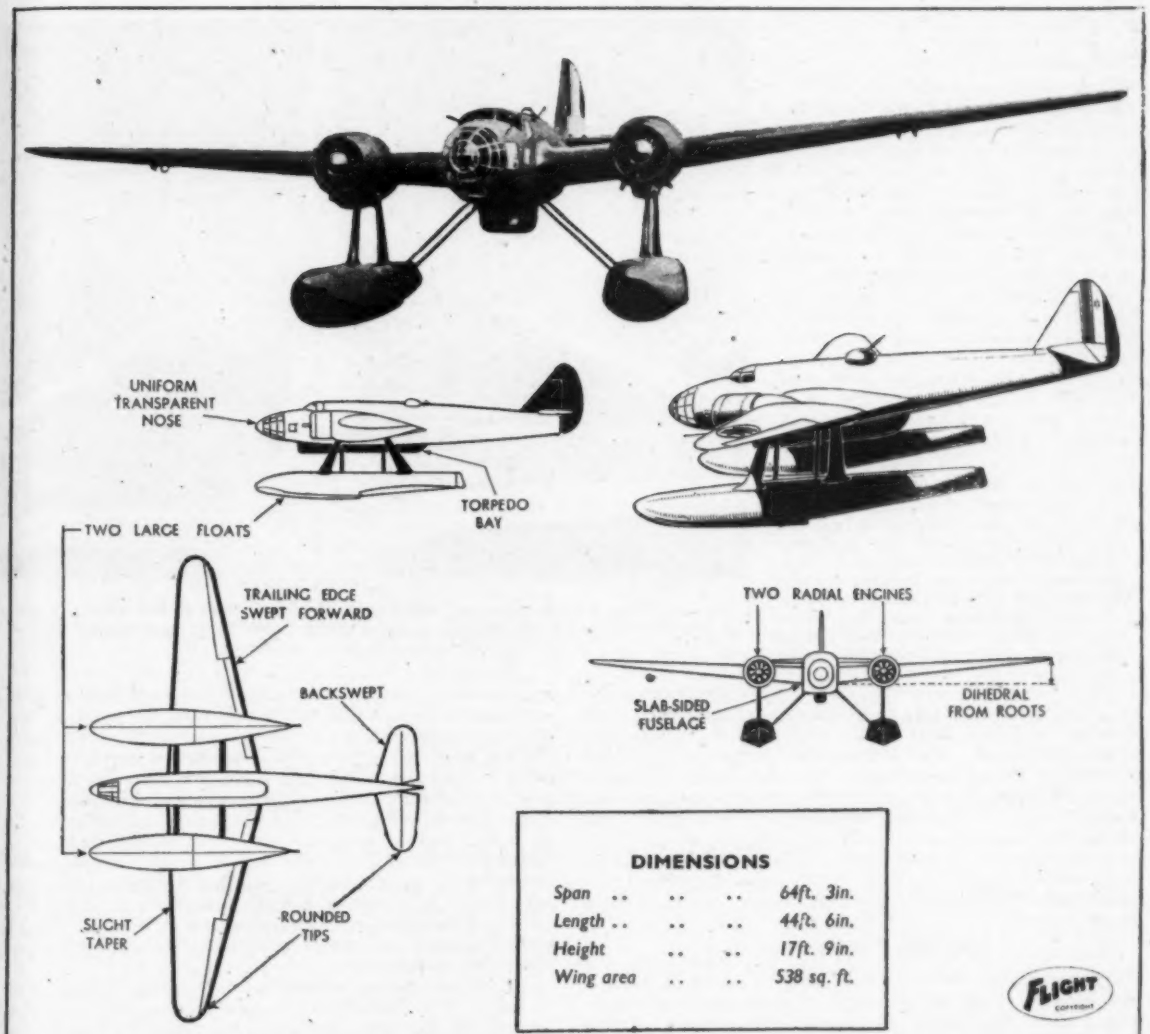
Powered by a pair of 900 h.p. nine-cylinder B.M.W. air-cooled radial engines, the He 115 has a top speed of about 215 m.p.h., and cruises at 186 m.p.h. Its service ceiling is 21,320ft., and its cruising range about 1,300 miles.

Of mid-wing design, the centre-section is rectangular but tapers in thickness towards the engine nacelles. The leading-edge of the outer wing panels are sharply backswept and the tips rounded. The wide, strut-braced tailplane tapers mostly on the leading-edge and also has round tips, but the single fin and rudder of large area are of angular shape with a broad flat apex. The long, narrow fuselage has a "glasshouse" in addition to a transparent nose, and the side view presents a decidedly ragged outline. All-metal construction with smooth metal skin is employed, the fuselage being of the monocoque type. Control surfaces are fabric-covered. Armament comprises four 7.9 mm. machine guns and one 20 mm. cannon, and the internally-stowed torpedo may be replaced by a 1,760lb. bomb load.



...heir Characteristics

FIAT R.S.14



DIMENSIONS

Span	*64ft. 3in.*
Length	*44ft. 6in.*
Height	*17ft. 9in.*
Wing area	*538 sq. ft.*

SIMILAR in purpose and general layout to the He 115, the Fiat R.S.14 torpedo-bomber represents its makers' first incursion into marine aircraft, as they had previously concentrated on bombers and fighters to the exclusion of all else. Shore-based seaplanes have been widely used during the present war in the Mediterranean by the *Regia Aeronautica*, and the Fiat R.S.14 is one of the latest Italian designs in this category, first making its appearance in 1941, but not reaching the coastal squadrons in operational guise until fairly recently.

Unlike the Heinkel floatplane used by the "Senior Partner" of the Axis, the R.S.14 is of excellent aerodynamic form, and although a trifle smaller and lower-powered, it should be capable of an appreciably better performance.

In its original form, in fact, this mid-wing, twin-engined seaplane was strikingly "clean," but later versions have grown an elongated bulge below the previously sleek fuselage in which is housed either a torpedo or a similar weight in bomb-load. Operationally speaking, however, this effects a useful diminution in drag, because the torpedo had to be slung externally until this streamlined bay was added.

Another modification to be effected since the prototype gave place to the early production models, is the provision of a transparent nose. This is beautifully symmetrical (in contrast to the ragged snout of the He 115) and very greatly improves the view of the bomb- or torpedo-aimer.

The R.S.14 is fitted with a pair of 840 h.p. Fiat A.74 R.C.38 air-cooled radial engines, but a number of later versions have 1,000 h.p. Piaggio P.X1 R.C.40 air-cooled radials, which should step up the performance considerably.

Up to the time of writing, no official data on such important matters as performance and armament have leaked out of Italy, but there is a dorsal gun-turret.

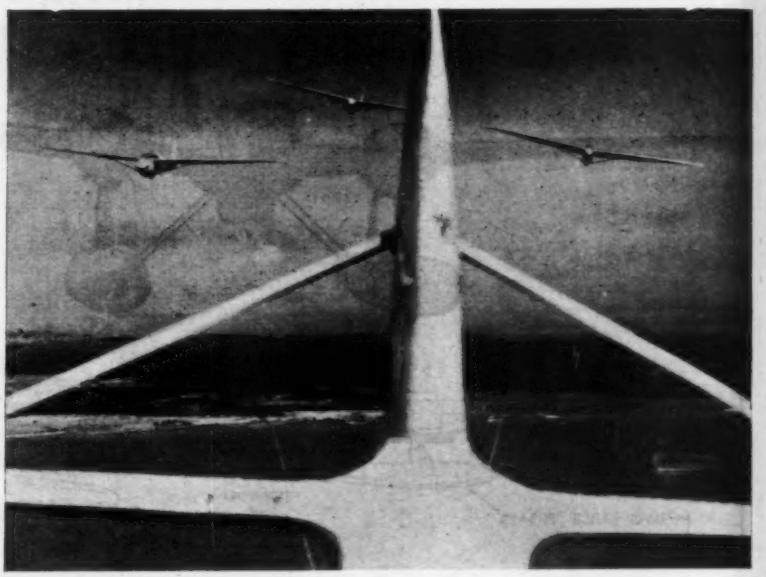
All-metal construction with stressed-skin light alloy covering is employed, the fuselage being an oval-section monocoque structure with flattened sides.

Towed Gliders

An Objective Examination of Their Performance by American Experts : Increased Payload, but Severely Restricted Range

ONE feels strongly inclined to use the expression "debunking" in describing briefly the very excellent examination which two American experts, Dr. Alexander Klemin and Mr. Walter C. Walling, have made of the aerodynamic performance of the towed glider. Mr. Walling we have not the honour of knowing personally, but he is aerodynamics research engineer at the Lockheed Aircraft Corporation, and Dr. Klemin is a very old friend of ours. He is Guggenheim Research Professor of Aeronautics at the College of Engineering of New York University. Both, we feel sure, would deprecate the use of such an expression to describe their findings. The most they did in the summary of their paper, which was presented at the Aerodynamics Session of the eleventh annual meeting of the Institute of the Aeronautical Sciences, was to say :—

> "The towed glider or the aerial train as it is sometimes called has been employed successfully for war purposes *under special conditions.** Such successful military use and the increase in payload which follows when a powered airplane is used to tow a string of gliders have led to optimistic evaluation of the glider train both for military and commercial purposes."



. . . . "When the tug is towing three gliders, rate of climb at sea level and the ceiling become inordinately low . . . . the glider train could only operate satisfactorily over low-lying country."

Their conclusions are such as to show that the benefits of glider trains are likely to be far smaller than many had thought, and that their applications may be confined to special conditions. The authors modestly state that "No amount of theoretic discussion will determine the possibilities of the glider train. Coupled with theoretic discussion there will have to be service experience and, coupled with service experience, careful analysis of operating costs." But since the paper deals with fundamentals, even the tentative conclusions reached should serve as a useful brake on those enthusiasts who have not given the subject the same deep study.

Results of Calculations

The paper is divided into three sections, of which the first sets down certain aerodynamic theorems and discusses towed glider design and performance indications which are apparent from the theorems themselves. Part two contains the actual calculations for a conventional aircraft as the tug, to which one, two, three or four gliders are attached. In part three are discussed the results of the calculations. This part is reproduced below, from the June, 1943, issue of the *Journal of the Aeronautical Sciences*. Here it might be explained that the tug used in the calculations is virtually the Lockheed Lodestar.

(1) The weight/take-off horse-power of the Lodestar is 18,500/2,400=7.7. and its maximum excess horse-power at sea level and normal rating is approximately 1,000 h.p. The ratio $3W_g/W_a=[3(13,800)]/18,500=2.23$.† If a tug is to be able to tow gliders whose weight is appreciably in excess of its own weight, there must be low power loading of the tug as well as good aerodynamic efficiency of tug and tow.

(2) Without departure from conventional design, a glider will have much higher aerodynamic efficiency than even an excellent powered airplane. Hence, from the point of view of aerodynamic efficiency, the tow should fly high above the tug, thus transferring load to the wings of the tug. Such arrangement might be dangerous because it might lead to overriding and excessive stresses in the cable.

(3) The calculations indicate one serious difficulty for the glider train. When the weight of the tow is large in relation to the weight of the tug, reasonable range can be secured only by combining quite low cruising speed with appreciable power drawn from the engine. This means that cooling difficulties are certain to occur. Either liquid-cooled engines or blower cooling for air-cooled engines would become necessary.

(4) When the tug is towing three gliders, rate of climb at sea level and the ceiling become inordinately low. It is conceivable that some method of assisting the take-off could be developed, but the glider train could only operate satisfactorily over low-lying country.

(5) With normal fuel capacity range becomes severely restricted.

(6) On the other hand, pay load increases enormously.

(7) It is the enormous increase in pay load which explains the fact that both the advantage factor (pay load × air speed)$_{\text{train}}$/(pay load × air speed)$_{\text{airplane}}$ and the glider train efficiency factor $\{[(\text{pay load} \times \text{range})/\text{consumed fuel}]_{\text{train}}\}/\{[(\text{pay load} \times \text{range})/\text{consumed fuel}]_{\text{airplane}}\}$ appear so advantageous.

(8) Enthusiastic approval of the glider is generally based on the increased pay load and on the improvement in such efficiency factors as the two given above. Such advantage cannot be taken at face value for ordinary air transport operation. Such ratios merely indicate that for a low horse-power loading a high horse-power loading has been substituted. If actual costs of operation are examined, it will be found that several factors militate against the appar-

* *The italics are ours.—Ed. FLIGHT*

† W_g = wt of glider ; W_a = wt of tug

TOWED GLIDERS

ent advantage. Because of the difficulties of the take-off and the low rate of climb and the short range, the block-to-block speed will be more sharply decreased in relation to the cruising speed, which is the case in normal air transport operation. With head winds the block-to-block speed would become quite unsatisfactory. Glider train efficiency factor would be greatly decreased because of the extra gasoline consumed in take-off and climb, and the relatively short-range flights that would be permissible in the glider, when reserve fuel is properly taken into account. (However the disadvantages in take-off, climb, and range of glider trains might be partially overcome by refuelling the tug in flight and by towing additions to the train at intermediate points to the flight altitude by an auxiliary tug, where they could be coupled in flight.)

(9) In estimating direct flying costs almost every item of cost per mile (pilot's pay, insurance, maintenance, depreciation, etc.) varies inversely as the block speed. With the block speed sharply reduced for the reasons mentioned previously, it is not at all certain that the direct cost per mile would be lowered. On the contrary, the direct cost per mile might actually go up, as it is apt to do when an ordinary transport airplane is designed with a high pounds per horse-power loading. (Estimates of direct flying costs are now being undertaken by the authors and will be submitted in an appendix to the present paper.)

Limitations

(10) In setting forth the merits of the glider train, its proponents should not fall into the error of some friends of the helicopter who, in addition to claiming the advantages that the helicopter indeed possesses—such as extraordinary ability to operate in restricted terrain and its power of hovering for close observation, its serviceability for short hop work—also announce that the helicopter will ultimately develop great speed and efficiency (which is not at all likely). The proponents of the glider train would do better to regard it realistically and to emphasise a number of services which the glider train can really perform.

(11) In a military situation, for example, where large numbers of troops or quantities of supplies are to be transported over a short stretch of sea or over a short stretch of level land, the enormous carrying capacity of the cargo train would be invaluable.

(12) In air transport operation, a glider pick-up service would be invaluable and would be a logical corollary to the mail pick-up service, which has already proved so valuable. The calculations indicate that where the tow picks up but a single glider, climb (and hence take-off) will be entirely satisfactory.

(13) Again, in air-cargo operation, the enormous increase in pay load possible by the use of a glider train would give the air-line operator highly useful and inexpensive overload or emergency equipment.

Aerial Locomotives

(14) Finally, the calculations indicate that the possibilities of the glider train cannot be fully exploited with the use of the airplane and power plant as they are available at the present time, but that it would be well worth while to design an aerial locomotive or tug truly adapted to such service. The general specification would be somewhat on the following lines:

(a) The power plant would be so designed that adequate cooling would be available at a relatively slow speed.

(b) The power plant would be so designed that by means of change speed gear, variable pitch, variable compression ratio or similar means the useful working range of the engine would be extended from full power to a small fraction of the full power.

(c) When traffic is light, the tug would operate alone at high speeds and at a fraction of full engine power. Hence, the tug would be small and highly "overpowered."

(d) As traffic grew heavier, the operator could progressively add glider after glider to his train, the flight engineer would be able to increase the power of the engine to an almost corresponding degree, and the train would function without too great a loss of speed.

(e) By a combination of such means a truly flexible, economically worth-while piece of equipment might be placed in the hands of the air line.

(f) Since it would be advantageous to run the tow cable from the centre of gravity of the glider to the centre of gravity of the airplane, designers might perhaps care to give consideration to a tug airplane with tail surfaces first—i.e., to the Canard type.

W.A.A.F. Art Exhibition

Pictures, Models and Handicraft on Show

A VERY interesting exhibition, an outcome of the art and handicraft studies fostered by the new scheme of W.A.A.F. Progressive Training, was recently opened at the National Portrait Gallery by Air Chief Commandant H.R.H. The Duchess of Gloucester, C.I., G.B.E., who was received on arrival by Air Marshal Sir Bertine E. Sutton, K.B.E., C.B., D.S.O., M.C., Air Member for Personnel, and Air Chief Commandant K. J. Trefusis Forbes, C.B.E., Director of W.A.A.F.

The exhibition, which remains open until August 31st, includes paintings, drawings, needlework, embroidery and all branches of handicraft, fashioned often in remote stations, under difficult conditions, and often with scanty materials. The authorities are fully alive to the importance of encouraging these spare-time activities, for it has been proved that the release of those recreative energies lead to better all-round efficiency. They encourage inventiveness and resourcefulness in brightening up sometimes dull or comfortless surroundings. For example, a particularly ugly wall of a room was transformed by A/CW. Benson, M., who, using large beaver boards, painted on them in oil an allegorical picture "The Pilgrimage."

Another W.A.A.F. unit turned some odd pieces of discarded wood, sacking and nails into hardwood furniture.

Amongst the many oil paintings and drawings, special note should be taken of the work of A/CW. Elva Blacker, A/CW. 1 Lilian Buchanan, L.A/CW. Pen-Symons, A/CW. Hudson, S/O Joy Millar, L.A/CW. Scott, A/CW. Bird; many of the exhibitors are professional artists now serving in the W.A.A.F.

The needlework section of the exhibition is particularly large and successful. All the exhibits are by amateurs, some with no more training than they are able to get in their spare time. It is not possible to mention individually all the work in this section, but of almost historical interest is a tablecloth by Flt./O. Parsons, with embroidered signatures of the members of the original W.R.A.F. company, many of whom are now serving in the W.A.A.F.

Examples of all classes of needlework are included, *i.e.*, delicate embroidery, pictures in coloured silk, drawn-thread work and a very effective cushion cover by S/O Macdiarmid, executed with odd lengths of knitting wool, for the comfort of a far-away station at Corsewall.

Exhibits that would delight the shades of Teniers and Hogarth are models by S/O Turnbull, an intelligence officer in the W.A.A.F. One model, measuring about one foot by ten inches, represents "The interrogation of the crew of C for Charlie"—a perfect scale model in Barbola paste of the scene in an interrogation room after night operations. The model is complete in every detail from the padded jackets and leather flying boots of the aircrews to the airwoman carrying a tray laden with mugs of tea. This exhibit has already been purchased by Air Chief Marshal Sir Arthur Harris, Commander-in-Chief, Bomber Command.

By the same artist is also a model of the ante-room of the W.A.A.F. Officers' Mess at tea-time, complete with a minute tea-trolley, pictures on the wall, and even a tiny replica of a weekly magazine the size of a postage stamp.

Pewter, jewellery and toys are also included in the exhibits. Some of the entries are for sale and part of the proceeds will be given to the R.A.F. Benevolent Fund. The exhibition is free to the public.

Civil Aviation

Control or Competition?

Four M.P.s Submit Well-considered Policy Embracing International Convention : U.S. Airlines Look to American Interests

THERE can be few, if any, people in this country or America who, if they take any interest in air transport, are not aware that the organisation of civil aviation, both nationally and internationally, is going to be about the biggest single problem of the post-war era to solve.

It has now been generally accepted—and none too soon—that a start must be made on this gigantic task at once, but even those who agree on what must be done are by no means unanimous about the best way to do it.

It is more or less inevitable, too, that there should be elements—and quite strong ones—which are far more concerned with arranging things to benefit themselves than they are with avoiding a post-war world which might be anything but peaceful where commercial aviation was concerned, though they might agree in theory with the ideal that aviation's function is to give the best possible service to the greatest number of people.

So far as Great Britain is concerned, we have been assured by Government speakers that negotiations of an exploratory nature have already been opened between this country and the Dominions as a first tentative step towards the formation of an Empire policy which must be established before we can treat satisfactorily with other members of the United Nations outside the British Empire.

Informal Committee of Four

In the meantime, four Conservative M.P.s, working as an informal committee, have been busy studying the whole problem for the past six months and have now issued a statement setting forth their views and making definite recommendations. This committee, comprising Mr. Ronald Tree, Mr. W. R. D. Perkins, Grp. Capt. J. A. Cecil Wright and Sir Alfred Beit, pay just tribute to Dr. Warner, Vice-Chairman of the U.S. Civil Aeronautics Board, by taking as the basis of their deliberations the pronouncement of this celebrated American, who said: "The first and fundamental concern of air transportation is to render genuine public service to the largest number of people. Air transportation is making the whole world one neighbourhood. Hopes for the future must be based on the presumption that air transportation is a good thing and that the whole world needs to share its benefits. . . ."

Saying that a world air transport system internationally owned and operated would not be acceptable either to the U.S.A. or the U.S.S.R. and would not command general support in the present House of Commons, the committee advocates, as attainable objectives, an international Convention embodying the principles expressed in the words of Dr. Warner, to which the British Empire should adhere, an international authority for the regulation of air navigation, and, thirdly, agreed machinery for the promotion of air transport and air commerce between nations.

Empire Air Board

The British Government should expand the functions of the Air Registration Board in the U.K. on lines similar to the Civil Aeronautics Board in the U.S. to include the general duty of planning air routes, hearing applications of would-be airline operators and deciding between them. It should then invite the Dominions to do likewise and join with the U.K. in constituting an Empire Air Board.

"The Committee," says that body's report, "sees every hope that such an Empire Air Board would find it possible to act together on major questions affecting the development of Empire air transport, including international questions, without infringement of the domestic liberty of each Dominion (including the U.K.) on air transport matters."

The next step recommended would be for the Empire Air Board to advocate an international convention, including the following points:—

(a) The right of "innocent passage" and of emergency landing to be absolute and universal, and the practice of establishing "prohibited areas" to be forbidden.

(b) The operation of airlines between two points in the same country or related geographical area to be a matter of domestic policy for that country, e.g., New Guinea would be regarded as a "related geographical area" of Australia.

(c) The operation of airlines between two nations or groups of nations to be a matter for arrangement between the countries concerned on a basis of reciprocity or agreement, which agreement the signatories to the Convention would undertake not unreasonably to refuse (e.g., in the British Empire freedom of airport user and of air commerce would be unconditional for British operators, and would be granted to foreign operators in exchange for reciprocal privileges or otherwise by agreement).

(b) Sovereign rights over airports to rest with the Governments of the countries in which they are located. The signatories to the Convention would undertake not

THE YORK—via NEW YORK! Although no picture of the new Avro York civil air transport has yet been released in this country, *Flight* makes no apology for printing this photograph of Mr. Roy Chadwick, its designer, holding by its tail a model which gives a good impression of its proportions, since it appeared in an American contemporary with an article by Leonard Engel on "Tomorrow's Transports?" With Mr. Chadwick are Messrs. R. H. Dodson, Avro's managing director, and C. E. Fielding, a director and assistant general manager.

CONTROL OR COMPETITION?

to exercise their rights by way of "flag discrimination" for or against any nation having reciprocal agreements.

Special arrangements—involving a modification of item (c) above—are suggested for airline operation within Continental Europe, the fundamental principle governing such arrangements being the necessity for a single European authority to control the trunk routes throughout the Continent, on the lines successfully followed by the Federal authority in the U.S. The Allied Governments, the committee thinks, might appropriately prepare, as a model, alternative methods for participation in European air transport on the assumptions of:—

(a) A European Air Transport Company in which each nation would be interested on an equal basis to operate European routes.

(b) A European Air Board whose licence would be required by would-be operators within Continental Europe.

Proviso for the Axis

European nations with overseas possessions would be free to run air services between such possessions and the Mother Country, and would also be free to develop air services to foreign countries in other continents on the reciprocal basis already mentioned. The Axis powers, however, would be excluded from the latter facility so long as they were barred by the United Nations' settlement.

On the subject of British domestic air policy, the committee first of all advocates the transfer of responsibility from the Air Ministry to a Civil Transport Ministry which should appoint the U.K. Board of Aeronautics. Indeed, the committee more than advocates this change; it is "convinced that it is essential."

The need to distinguish clearly between the various kinds of payments which in the past have been termed subsidies is also stressed. For example, it does not class a mail surcharge as a subsidy, but as "the proper additional economic value of air mail service." It also recognises that special subsidies may be necessary, in the transition period, to airlines which are obliged to use uneconomic aircraft until economic air transport types become available, and also to what it terms "infant air-routes" which may be desirable for the promotion of commerce or the development of backward areas. The latter should be operated by a "chosen instrument" of the Government, and their costings and subsidies disclosed. Most main air routes after the war should be self-supporting, however.

Remarking that air transport operators should not be expected to find the capital cost of airports and navigation services any more than shipping lines are expected to build their own harbours and lighthouses, the committee recommends the wise expenditure of public money for these facilities as being the best form of subsidy for air transport in general and, therefore, in the national interest. Like the shipping companies, the air transport operators should pay reasonable dues for the use of such facilities.

The foregoing is, of course, a summary of the chief points in the committee's report which has been issued in pamphlet form, the full text including some suggestions on international regulations controlling technical matters, the establishment of "regional conferences" of operators in the chief areas to deal with such things as schedules, fares, etc., and means of dealing with breaches of the Convention and defiance of regulations. But the reader will appreciate the general lines on which this unofficial committee suggests the whole problem should be tackled, and will doubtless agree that it would form a sound basis for a practical and fair solution.

We now turn to the statement recently issued—indeed, its appearance was practically simultaneous with the one just reviewed—of the Joint Air Transport Committee representing three important bodies, namely, the Association of British Chambers of Commerce, the Federation of British Industries, and the London Chamber of Commerce.

This committee is broadly representative of British trade and industry, but excluding aircraft manufacturers and airline operators. In short, it speaks for this country's future *customers* of air transport; those who will benefit if Dr. Warner's fundamental principles, accepted by Mr. Ronald Tree's unofficial committee, are universally adopted by the United Nations and duly given practical effect.

They are concerned with two statements of policy issued as a result of the recent conference of U.S. airlines in Washington, their interest in them being naturally confined to these developments in so far as they touch upon the British problem. The two policies in question are diametrically opposed to each other, but neither of them hold out much prospect of conferring maximum benefit on the post-war world as a whole, the sole object of their respective sponsors being, apparently, to confer the maximum benefit on American aviation.

The first of these two American policies is supported by 16 U.S. airlines, and advocates free and open competition on the international air routes. The second is advanced by only three U.S. airlines, Pan-American Airways, American Export Airlines, and United Airlines, and it is pressing President Roosevelt to limit the international routes to one single combine. It is worth noting here that only Pan-American and American Export are now allowed to operate international air routes, and that the first group of 16 airlines either have filed, or intend to file, applications to operate international routes after the war. Mr. Sam Solomon, president of North-East Airlines, stated to the Press after the conference: "I know of no domestic airline that has not ambitions to engage in international service."

Commenting upon these policies, the Joint Air Transport Committee points out that, because of sacrifices made in the common cause, there is not one European country among the United Nations which could join in "free and open" competition with the United States without grave embarrassment, immediately after the war, and blames the delay of the British Government in announcing a definite policy as being the cause of the "one-combine" recommendation of Pan-American and American Export.

Fear of British Competition

This would appear to be justified, since the minority American policy is defended by a statement which speaks of the fear that "global airlines after the war will be crowded with Government-dominated and Government-owned companies of other countries, *notably the British Empire* (the italics are ours), thus making it difficult for the highly competitive U.S. airlines to operate profitably."

It has been reported that Britain is to confer with America in the not-too-distant future on the problem of post-war air transport, in which case it is not to be supposed that President Roosevelt will make any important decisions in advance of such a conference, but, in the absence of any definite statement of policy by the British Government, the American airlines cannot be blamed for looking after their own interests. Indeed, if this frank intimation that they mean to study their own interests first and let the rest of the United Nations' air transport services "stew in their own juice" has the effect of jerking the British Government out of its lethargy, then our friendly rivals will have done us a very good turn indeed!

Last week *Flight* commented editorially upon a project launched by TWA, by which America might supply machines and trained personnel to help foreign nations to establish airlines after the war. The prime motive, honestly stated, is to benefit U.S. aviation by cultivating the habit of using American aircraft.

We cannot say we have not been warned!

THIRD ANNUAL A.A.I. CONFERENCE

THE Association of Aircraft Inspectors held its third annual conference in London recently. The conference was attended by 45 delegates, representing 40 branches from all over England and Scotland. In addition to discussing purely domestic matters, the conference passed resolutions approving the Beveridge Report in principle, and the principle of equal pay for equal work. In his address the chairman, Mr. H. T. Brigden, recalled that the Association had become a registered trade union. Membership was increasing, but more were wanted.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

"WHISPERING DEATH"

Japs' Name for the Beaufighter

I RECENTLY heard a story to the effect that the Japanese forces refer to the Bristol Beaufighter as "Whispering Death."

I cannot understand this name, as the powerful Hercules engines of this aircraft could surely not be regarded as making any noise which might be called whispering.

I should be pleased to know if there is any explanation for this name.

"HERCULES."

ELEMENTARY FLYING TRAINING

Difference in Angle of Attack

N. GIBSON'S trouble is due to his forgetting that an aircraft moves downwards when gliding, upwards when climbing. In gliding, Fig. 1, the wing is nearly horizontal. AB represents forwards speed, BC rate of descent, CA the resulting relative wind. CAB is, then, angle of attack, and increase in speed causes decrease in this angle.

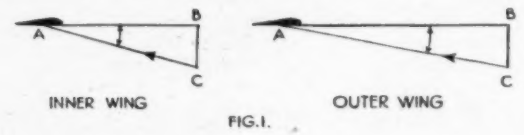


FIG.1.

FIG.2.

In climbing, Fig. 2, the wing has angle of incidence BAX. As before, AB represents forwards speed, BC the rate of climb, and CA the relative wind. The angle of attack is now XAC or XAB – CAB, and any increase in speed causes a decrease in CAB as before, but an increase in angle of attack.

J. R. RIDDELL.

INSTRUCTORS' DILEMMA

Regulations are Based on Experience

REFERRING to "Pater's" letter in your issue of August 5th, I would like to point out a few facts to him.

There is no ban on flying below 2,000ft. when authorised to do so. When such authorisation is given, it is always specified where the low flying is to take place. There is usually an area allotted for such a practice where anyone who is going to crash can do so and cause the minimum of damage to others. Such an area would obviously not include a large school. The pilot whom "Pater" seeks to defend was four miles outside the area, which, if he was a reliable instructor, he must have realised perfectly well. Even one minute can be a very long time in an aircraft.

"Pater" says: "Here we have the case of an instructor teaching what he knows . . . to be vastly important, but, owing to an accident, being severely dealt with for so doing." What he should have said was: "Here we have a pilot breaking safety regulations and producing an all-time record of the potential results of so doing."

From my own experience, I can state that practically all non-operational accidents (except the very rare structural failure) can be directly traced to the captain of an aircraft flatly disobeying an order, or at least failing to comply with a regulation. All these regulations are issued as the result of bitter experience of previous accidents.

His son's experience, quoted by "Pater," is a little outside the argument, but he may console himself with the fact that had the son been allowed to rush off and practise aerobatics as soon as he could balance a Hurricane round the sky, he would probably have killed himself. The fact that in an emergency he was able to carry out some unorthodox manœuvre without previous practice only points to the soundness of his basic training. The authorities realise the necessity of teaching walking before running, but if the devil chases the walker, no one will blame him for trying to run.

If "Pater" wants evidence of the capabilities of this particular instructor, Heaven forbid that he should be allowed to canvas votes from his pupils. Let him rather ask those pupils' commanding officers if the products they have received are reliable and well disciplined, as well as good pilots.

Without any reflection on the instructor concerned, I can safely say that everyone knowing anything about instructing was surprised at the mildness of the punishment and not the severity.

I wonder if "Pater" would have felt the same if his son had been among the eleven children killed?

"FLOATING FLIER."

TOPICS OF THE DAY

Sole Criterion of Technical Progress

MAY I congratulate "Indicator" on his courageous and original views, and thank you for publishing his article in your issue dated July 29th.

I had almost concluded that my thoughts on the place of technology in the society of the future were lone cogitations in the wilderness, and to see such ideas become articulate in a technical journal is gratifying.

The letter by N. Barraclough in the same issue is an interesting coincidence. The sole criterion of technical progress is "fitness for purpose," and the integration of means and ends is the most vital function of social philosophy. Without such breadth of philosophic vision there can be no true progress, technical or otherwise, only what the Archbishop of Canterbury has aptly termed a "mere multiplication of gadgets."

Blindness towards these issues can only produce a mentality reminiscent of the juvenile exuberation characteristic of a nursery full of new toys on a Christmas morning.

One of our greatest contemporary intellects, that of Prof. A. N. Whitehead, the Cambridge philosopher and mathematician, in his book "Science and the Modern World," has pointed out the grave dangers attending specialisation and professionalism in knowledge at the cost of conceptual vision.

Regarding aviation in particular, can one imagine a prospect more grotesque and horrifying than a few million incompetent ex-motorists transferred to the "peacetime" (!) skies in cheap mass-produced helicopters!

It is possible to be an enthusiast in one's particular profession, indeed it is necessary so to be if one is to be of any use, but surely this is possible without fatal mutilation of one's deductive powers.

"FITTER II ENGINES."
R.A.F.

This Blacketeering

I RICHLY deserve the good-natured reprimand from "Maccabee, R.A.F.," in the issue of August 5th. Not so much because of the opinions expressed in "The Psychology of Slang," but because these opinions were badly expressed.

Though a particular section of the community was mentioned by name in two sentences, I did *not* intend my remarks to be taken thereafter as applying only to this section. On reading the article through again I must say that I could blame no one for mistaking the meaning.

The diatribe was directed against the Get-Rich-Quick (at anybody's expense) Smart Alecs who, during the last hundred years, have succeeded in spoiling the world for the rest of the people and who will continue to spoil it during the next hundred years if we let them. The fault is, and has been everyone's—since the industrial revolution financial "success" has been made into a virtue.

I see no happy future for people until the standards have been changed, and I object to the go-getters whether they are Anglo-Saxons or not; there are plenty of them in all communities.

"INDICATOR."

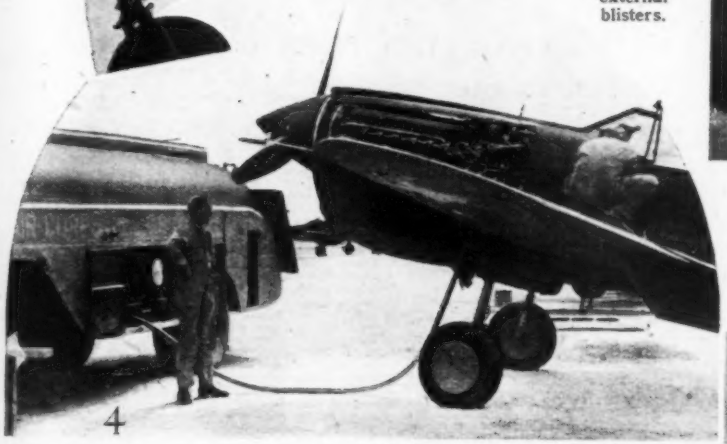
Russian Lease-Lend

Persian Depot Where British and American Aircraft are Handed Over to the Russian Air Force

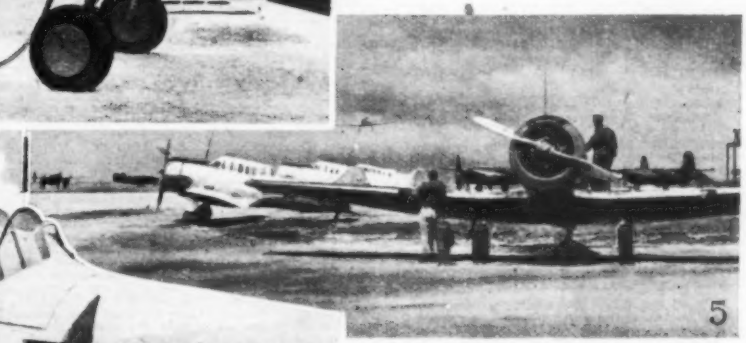
1. Rows of Douglas Bostons, Curtiss Kittyhawks and North American Mitchells ready for collection by Russian pilots.

2. Supermarine Spitfire Vs and Curtiss Kittyhawks seen from the Boston park. The Bostons only carry two front guns and do not have the two external blisters.

3. Change of ownership but all to the same purpose; painting the Russian red star insignia on the fuselage of a Kittyhawk.



4. American airfield-staff filling the fuel tanks of an Allison-engined Kittyhawk ready for its delivery flight to somewhere in Russia.



5. Trainers for the Russian air force; North American Harvards parked at the edge of the perimeter track. By the lack of dispersion it is to be presumed that the depot is out of German bomber range.

6. A North American Harvard (N.A.16.3 or AT-6A) being handed over by Master Sgt. L. H. Byrd to Major Kroolov, one of the Russian acceptance pilots.

"Flight" photograph.

OPS ARE ON : A W.A.A.F. driver takes the bombs-train round the dispersal points of a Typhoon bomber station. The Typhoon carries a 500lb. bomb in an external rack under each wing.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Air Staff Appointments

THE Air Staff has been partially reorganised and Air Vice-Marshal N. H. Bottomley, C.B., C.I.E., D.S.O., A.F.C., Assistant Chief of Air Staff (Operations), has been appointed to the re-established post of Deputy Chief of Air Staff.

Other new appointments are: Air Vice-Marshal Douglas Colyer, C.B., D.F.C., to be Assistant Chief of Air Staff (Policy) and Air Vice-Marshal Douglas Harries, C.B., A.F.C., to be Director General of Personal Services. Air Chief Marshal Sir Charles Portal remains Chief of Air Staff and Air Marshal Sir Douglas Evill is still Vice Chief.

An appointment to the post of Assistant Chief of Air Staff (Operations) to replace Air Vice-Marshal Bottomley will shortly be announced. Other Assistant Chiefs of Staff are: (General) Air Marshal Sir Richard Peck; (Intelligence) Air Vice-Marshal F. F. Inglis; (Technical Requirements) Air Vice-Marshal J. D. Breakly.

Awards

THE KING has been graciously pleased to approve the following award:—

George Cross

Act. Wing Cdr. J. S. ROWLANDS, M.B.E., R.A.F.V.R.—For over two years Wing Cdr. Rowlands has been employed on bomb disposal duties, and has repeatedly displayed the most conspicuous courage and unselfish devotion to duty in circumstances of great personal danger.

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy:—

Distinguished Service Order

Wing Cdr. T. S. RIVETT-CARNAC, D.F.C., No. 156 Sqn.—Whilst actively engaged as commanding officer, Wing Cdr. Rivett-Carnac has completed many sorties against the enemy's most vital targets with marked success. This officer has recently attacked Berlin on three occasions and has also participated in raids on Spezia and Munich.

Sqn. Ldr. A. D. FRANK, D.F.C., R.A.F.O., No. 10 Sqn.—This officer has served with this squadron since December, 1942. During his flying career he has participated in attacks on every important target in Germany and Italy, including Berlin, Cologne, Hamburg and Essen. On several occasions his aircraft has been damaged by enemy action and pursued by night fighters, but in spite of all hazards he has almost invariably secured valuable photographic evidence of the accuracy of his attack.

Sqn. Ldr. D. A. GREEN, D.F.C., R.A.F.V.R., No. 467 (R.A.A.F.) Sqn.—This officer has served as flight commander with his present squadron since its formation. He has devoted all his time and energy to the training of his crews. He has also completed a number of daring operational missions, the majority of which have been directed against the enemy's most heavily defended targets such as Berlin, Essen, Hamburg and Munich.

Act. Sqn. Ldr. B. DUIGAN, D.F.C., No. 156 Sqn.—After completing his first tour of operational duty in 1940, this officer volunteered for duty in the Middle East, where he completed numerous outstanding missions. In particular, he played an important part in the capture of Habbaniyah in May, 1941. Since his return to this country he has taken part in many bombing raids. In April, 1943, he participated in the attack on the Italian naval base at Spezia when he bombed the target accurately and effectively in spite of the fact that a hurricane was blowing through the cabin from the jammed escape hatch.

Act. Sqn. Ldr. C. A. HUGHES, D.F.M., R.A.F.V.R., No. 7 Sqn.—This officer has completed a large number of operational flights. Since the award of the D.F.M. he has, on many occasions, proved himself to be an exceptional captain, steady and reliable and with a long record of successful operations to his credit. He has taken part in numerous sorties against German targets, such as Bremen, Hamburg, Stuttgart and Berlin, and can always be relied upon to press home his attacks with the utmost fervour and enthusiasm.

Act. Sqn. Ldr. R. J. LANE, D.F.C, R.C.A.F., No. 35 Sqn.—Sqn. Ldr. Lane has been engaged in operational duties for a long period and over a wide range of targets. This officer has recently been on operational sorties to such targets as Berlin, Stuttgart and Munich, and by his courage and devotion to duty has achieved many outstanding successes.

Act. Sqn. Ldr. K. J. LAWSON, D.F.C., R.A.F.V.R., No. 156 Sqn.—This officer is on his second operational tour and has taken part in a large number of attacks on well defended and distant enemy targets, such as Berlin, Spezia and Cologne.

Act. Sqn. Ldr. G. H. MALCOLM, D.F.C., R.A.F.V.R., No. 7 Sqn.—Over an extended period this pilot has proved himself to be an efficient and capable bomber captain. Over such well-defended targets as Stuttgart, Berlin, Cologne and Wilhelmshaven he has shown a total disregard of opposition.

Act. Sqn. Ldr. G. D. SISE, D.F.C., R.N.Z.A.F., No 254 Sqn.—This officer has served continuously as a pilot in this squadron since August, 1940. On various occasions Sqn. Ldr. Sise has led the squadron in successful attacks against enemy shipping, during which no less than seven large merchant vessels have been destroyed.

Flt. Lt. R. A. P. ALLSEBROOK, D.F.C., R.A.F.V.R., No. 49 Sqn.—This officer has now completed a second tour of operational duty. Under his leadership his crew have completed many exceptionally effective missions and obtained many valuable photographs. On one occasion, when attacking Hamburg, a second run over the target was necessary before a 4,000 bomb, which had jammed, could be released. The attack was completed satisfactorily, though a heavy shell burst had previously set the port outer engine on fire and holed the fuselage. On another occasion, when owing to adverse weather, it was found impossible to identify an objective at Duisburg, a second objective at Dusseldorf was accurately bombed in the face of violent anti-aircraft fire. Flt. Lt. Allsebrook has also taken part in many daylight sorties which have included operations against the *Scharnhorst* and *Gneisenau* in the Channel.

Act. Flt. Lt. N. C. GREEN, D.F.C., R.A.F.V.R., No. 49 Sqn.—This officer has now completed two most successful tours of operational duty. As well as flying in the daylight attacks on Le Creusot and Milan, he has completed night bombing missions to the Ruhr, Hamburg and Berlin. During a flight to Milan he was attacked by an Italian fighter while in a disadvantageous position over the Alps. By exercising exceptional powers of airmanship, he manœuvred his aircraft so that his gunners could return the fire of the enemy plane, avoided serious damage and returned safely to base.

Act. Flt. Lt. J. A. SINCLAIR, D.F.C., R.A.F.V.R., No. 7 Sqn.—Throughout his entire operational career Flt. Lt. Sinclair has completed his duties in an exceptionally commendable manner. Since the award of the D.F.C. he has participated in sorties on Berlin, Kiel, Hamburg and Turin.

Act. Flt. Lt. J. S. WATT, D.F.C., R.A.F.V.R., No. 7 Sqn.—This officer has taken part in many missions since the award of the D.F.C. He has completed bombing attacks on many of the most strongly defended European targets such as Kiel, Berlin, Frankfurt and Hamburg.

F/O. T. F. WILMOT, R.A.F.V.R., No. 83 Sqn.—Throughout all of his missions this officer has proved himself to be an outstanding captain of aircraft. He has invariably pressed home his attacks with vigour and tenacity and has achieved

outstanding successes over such targets as Munich, Berlin, Essen and Hamburg.

Bar to Distinguished Flying Cross

Act. Sqn. Ldr. E. F. J. CHARLES, D.F.C., No. 611 Sqn.—This officer is a first-class fighter, whose fine leadership, cool judgment and efficiency have set an admirable example. He has destroyed 13 enemy aircraft and damaged several more.

Act. Flt. Lt. W. J. GREGORY, D.F.C., D.F.M., R.A.F.V.R., No. 141 Sqn.—As observer, this officer has completed much operational flying. Since being awarded the D.F.C. he has taken part in many sorties and has contributed to the destruction of four enemy aircraft.

Act. Sqn. Ldr. D. A. BRAITHWAITE, D.F.C., A.A.F.—Sqn. Ldr. Braithwaite has been in command of his flight since its formation in March, 1943. In addition to many hours flown in adverse weather on meteorological ascents over this country this officer has made many meteorological flights over distant parts of enemy territory. Once his aircraft was intercepted by a strong formation of Fw 190s, but he succeeded in flying his aircraft safely back to base.

Act. Sqn. Ldr. E. G. HUGHES, D.F.C., R.A.F.V.R., No. 540 Sqn.—Sqn. Ldr. Hughes has completed numerous photographic reconnaissance sorties since entering on his second tour of operational duty. His recent missions have included photographic reconnaissance flights over Berlin.

Act. Flt. Lt. J. B. AUSTIN, D.F.C., R.A.F.V.R., No. 138 Sqn.—Since the award of the D.F.C., Flt. Lt. Austin has completed numerous operations. On one occasion, while he was still several hundred miles from base, his aircraft developed trouble with its flaps which caused it to become practically out of control. After a considerable effort, Flt. Lt. Austin was able to regain control, and by his determination and skill he eventually flew back to base. In May, 1943, this officer again returned to this country safely, although his aircraft had been severely damaged by anti-aircraft fire and one engine was not functioning.

P/O. G. W. WOODWARD, D.F.C., R.A.F.V.R., No. 51 Sqn.—P/O. Woodward has a fine record of operational duty. Between June and October, 1942, he completed many anti-shipping sweeps in the Bay of Biscay. Since then he has attacked heavily defended European targets such as Essen, Cologne, and Stettin. Shortly after the outstanding sortie to Stettin, on which he earned the award of the D.F.C., he returned from a successful attack on Duisberg with only three engines functioning and made a safe landing at the base.

Distinguished Flying Cross

F/O. A. A. VALE, R.A.F.V.R., No. 126 Sqn.—This officer has completed a very large number of sorties, including numerous fighter-bomber attacks on airfields, industrial targets and ports in Sicily and has achieved much success. In May, 1943, he attacked railway buildings at Syracuse, obtaining hits in the face of heavy anti-aircraft fire. Some days later he flew in a formation of fighters which acted as escort to a bomber force detailed to attack Augusta. Many hostile fighters were encountered and, in the ensuing combats, F/O. Vale damaged two of the enemy aircraft.

P/O. C. H. ROBINSON, R.N.Z.A.F., No. 158 Sqn.—One night in June, 1943, this officer captained an aircraft which attacked Bochum. On the return flight the aircraft was attacked by two enemy fighters. The aircraft was hit by gunfire and P/O. Robinson was slightly injured in both legs by a cannon shell which passed between them. The rear turret was put out of action, but, although the bomber was continuously attacked for some fifteen minutes, P/O. Robinson, by skilful evasive action, prevented further damage before the enemy aircraft were driven off. On two previous occasions his aircraft had been damaged by enemy action but he flew it safely to base.

Act Flt. Lt. A. FREEDMAN, R.A.F.V.R., No. 221 Sqn.—This officer has taken part in many sorties. On one occasion in January, 1943, he undertook a mine-laying mission off the Crete coast. Heavy anti-aircraft fire was encountered and the aircraft was badly damaged, while the navigator was wounded. Nevertheless, Flt. Lt. Freedman accomplished his task and flew the damaged aircraft to base. In February, 1943, he took part in an attack on an enemy convoy and obtained a hit on a naval vessel. The following month, during a reconnaissance, he located a convoy in the Sicilian Narrows. He illuminated the target thus enabling following aircraft to execute a successful attack.

Act. Flt. Lt. D. R. MORRISON, D.F.M., R.C.A.F., No. 401 Sqn.—This officer has displayed great skill and tenacity in air operations and has destroyed 15 hostile aircraft. His gallantry was amply demonstrated on one occasion when, a few minutes after being picked up by a rescue launch in the North Sea, after being compelled to leave his damaged aircraft by parachute, he plunged overboard and rescued a naval rating from drowning.

Sqn. Ldr. J. R. ST. JOHN, No. 101 Sqn.—One night in June, 1943, this officer piloted an aircraft detailed to attack Malheim. During the flight the bomber was attacked by two hostile aircraft and repeatedly hit. Displaying superb airmanship, Sqn. Ldr. St. John succeeded in evading the attackers. Although one engine was unserviceable, a rudder missing, the starboard elevator damaged, and the elevator controls jammed, course was set for this country. In the face of great odds, Sqn. Ldr. St. John flew the aircraft to base and landed it safely.

Act. Sqn. Ldr. D. F. H. BIRD, R.A.F.V.R., No. 9 Sqn.—This officer has been squadron gunnery leader for four months, during which he has completed a number of operational sorties. These have included raids on Spezia, Berlin and Kiel, where heavy opposition is invariably encountered.

Act. Sqn. Ldr. R. BROADBENT, R.N.Z.A.F., No. 75 (N.Z.) Sqn.—Sqn. Ldr. Broadbent has displayed a high standard of efficiency and courage in the course of numerous operational missions. These have included sorties against Cologne, Berlin, Bremen and Kiel, and from several of these places excellent photographs have been obtained.

Act. Sqn. Ldr. J. F. CLARK, R.C.A.F., No. 405 (R.C.A.F.) Sqn.—This officer has shot down one enemy aircraft and completed many missions against the most strongly fortified targets in Germany. These have included Frankfurt, Berlin, Hamburg and Dortmund.

Act. Sqn. Ldr. J. T. MCCUTHEON, R.C.A.F., No. 404 (R.C.A.F.) Sqn.—This officer has flown on a large number of sorties of a varied nature. In December, 1941, he was captain of an aircraft acting as fighter cover during the Combined Operations raid on Vaagso, and with another aircraft he engaged four Me 109s, severely damaging two of the hostile aircraft. In May, 1942, Sqn. Ldr. McCutheon led a section of the fighter escort to Beauforts attacking the *Prince Eugen*. A year later he was the leader of a section accompanying four Hampdens on a shipping strike. Adverse weather forced the escort to return, but this officer continued on his mission and assisted the Hampdens during their torpedo attack by delivering a machine-gun attack on the escorting vessel. Five days later Sqn. Ldr. McCutheon made an attack on three enemy aircraft which were protecting an enemy convoy. Despite heavy opposition, he pressed home the attack, destroying one of the hostile aircraft, and only breaking off when his own aircraft was severely damaged.

Act. Sqn. Ldr. D. C. MACKENZIE, No. 467 (R.A.A.F.) Sqn.—Sqn. Ldr. Mackenzie has completed air operations in both fighter and bomber aircraft. The majority of his sorties have been attacks on the more strongly defended targets in enemy territory. These have included Berlin on three occasions, Duisberg, Essen and Spezia.

Act. Sqn. Ldr. D. H. A. MOORE, D.F.M., No. 51 Sqn.—This officer was awarded the D.F.M in 1940. He took part in the three "1,000-bomber" raids, and since then has operated successfully on anti-submarine patrols in the Bay of Biscay and in bombing raids over heavily defended European and Italian targets. He has invariably pressed his attack with vigour, and has on several occasions secured outstanding photographs.

Act. Sqn. Ldr. K. G. PRICE, R.A.F.V.R.—This officer has completed many successful attacks on enemy targets. He has served in fighter and bomber aircraft, and his enthusiasm and skill have been most praiseworthy at all times. In addition to his operational duties, Sqn. Ldr. Price has also had much success in the capacity of station navigation officer.

Act. Sqn. Ldr. W. R. SUGGITT, R.C.A.F., No. 428 (R.C.A.F.) Sqn.—This officer has a fine operational record, which has included sorties to all the most heavily defended centres in Germany and enemy-occupied territory. He has recently taken part in raids on the Ruhr valley, including Essen and Duisberg, and on the U-boat bases of North-West Germany and France. Despite intense anti-aircraft opposition, even when his bomber has been hit by shrapnel from very close shell bursts, he has always pressed home his attacks with the utmost determination.

Act. Sqn. Ldr. J. M. VINEY, No. 158 Sqn.—Throughout a large number of operational missions, Sqn. Ldr. Viney has attacked most of the major European targets, including Hamburg, Frankfurt, Stettin, Turin and Genoa, and the heavily defended centres in the Ruhr. On three occasions Sqn. Ldr. Viney has flown his aircraft safely back to base in spite of severe damage from enemy action. On another mission severe icing forced him to turn back three times before he finally reached the target, which was effectively bombed.

Flt. Lt. F. A. ANDREWS, R.N.Z.A.F., No. 75 (N.Z.) Sqn.—This officer is now on his second tour of operational duty. He has completed a large number of successful missions, undaunted by enemy opposition. His targets have included Mannheim, Bremen, Turin and Berlin.

Flt. Lt. G. R. COOPER, R.A.F.V.R., No. 61 Sqn.—Flt. Lt. Cooper has completed sorties against the most strongly defended localities in Germany and Italy, including the Ruhr, enemy naval bases and Berlin.

Flt. Lt. A. R. de L. INNISS, No. 248 Sqn.—Flt. Lt. Inniss has destroyed four enemy aircraft, and probably destroyed and damaged others. He has participated in many air combats and, on one occasion, took part in a low level attack on Cherbourg airfield, where casualties were caused among enemy personnel.

Flt. Lt. A. R. LAUGHLAND, No. 224 Sqn.—This officer has done excellent work as captain of aircraft over a long period. In April, 1943, he sighted and attacked two enemy submarines with good effect, one of which was destroyed.

Flt. Lt. C. G. MINCHINTON, R.A.F.V.R., No. 10 Sqn.—This officer has a long and distinguished record of operational work. He has taken part in many operational sorties against such targets as Berlin and Essen, invariably completing his duties as bomb aimer with courage and tenacity.

Fighters and Bombers

Flt. Lt. D. T. MOIR, No. 156 Sqn.—This officer operated against the Italians in Abyssinia and during the campaigns in Greece and Crete. As a fighter pilot Flt. Lt. Moir also completed a number of sorties and patrols in the Western Desert. Since April, 1943, he has completed a number of sorties with Bomber Command, always displaying the utmost determination and skill. During his tour in the Middle East he shot down three enemy aircraft.

Flt. Lt. G. NEWSHAM, R.A.F.V.R., No. 77 Sqn.—In attacks on targets in Norway, France, Germany and Italy, which have included Brest and Trondheim, Flt. Lt. Newsham has exhibited sustained brilliance in his duties, which has contributed much to the success of many sorties.

Flt. Lt. J. OLIVER, D.F.M., No. 106 Sqn.—This officer was awarded the D.F.M. in 1936 for services in air operations on the North West Frontier. Since the outbreak of war he has been constantly engaged in operational duties. Most of his sorties have been against targets in widely separated areas of Germany and the occupied countries, and have included such targets as Berlin, Essen and Duisburg.

Flt. Lt. J. A. WALKER, No. 86 Sqn.—Flt. Lt. Walker has flown on a large number of operational sorties, and has made seven attacks on U-boats. On one occasion the front turret of his aircraft was shot away, but with grim determination he continued to press home his attack. He has also undertaken two successful air/sea rescue missions, and twice has fought off attacks from Ju 88s in the Bay of Biscay. In addition this officer was largely responsible for the rescue of 147 survivors of a torpedoed merchant vessel.

Act. Flt. Lt. I. W. BAZALGETTE, R.A.F.V.R., No. 115 Sqn.—This officer has at all times displayed the greatest keenness for operational flying. He has taken part in many sorties and attacked heavily defended targets such as Duisburg, Berlin, Essen and Turin.

Act. Flt. Lt. D. BOOTH, R.A.F.V.R., No. 218 Sqn.—During an operation in July, 1942, immediately after leaving the target area, the turret door flew open, and had to be held by Flt. Lt. Booth in the full force of the slip stream until he managed to wrench it free when well over the Dutch coast. During this period the aircraft was attacked by two fighters. Since then this officer has taken part in numerous sorties, and on two occasions his aircraft has suffered damage from anti-aircraft fire. On both these missions Flt. Lt. Booth inspired his crew to continue, and the target was located and successfully bombed.

Act. Flt. Lt. G. B. BOREHAM, D.F.M., R.A.F.V.R., No. 7 Sqn.—This officer has now completed numerous operational flights. He has displayed great efficiency and accuracy in his navigational duties, leading his captain to many well-defended and distant targets such as Berlin, Cologne, Munich and Dusseldorf.

Air Chief Marshal Sir W. Sholto-Douglas pinning the Conspicuous Gallantry Medal on Sgt. T. B. Petrie.

SERVICE AVIATION

Act. Flt. Lt. C. W. BRADLEY, R.C.A.F., No. 423 Sqn.—In March, 1943, Flt. Lt. Bradley was instrumental in saving a tanker which was threatened by a submarine. In April, 1943, he delivered a most skilful attack on a U-boat which was attempting to intercept a ship he was escorting. This attack achieved complete surprise, and resulted in serious damage to or destruction of the submarine. Despite severe weather and engine trouble Flt Lt. Bradley has several times flown his aircraft safely to base in harassing circumstances.

Act. Flt. Lt. R. G. CAMPBELL, R.C.A.F., No. 218 Sqn.—Flt. Lt. Campbell has successfully completed a large number of sorties against the enemy, many of which have been attacks on the most heavily defended targets in Germany. When returning from a sortie on Mannheim lately, this officer's aircraft was engaged by searchlights and damaged by anti-aircraft fire. His gunners returned the fire from a low level, silencing some of the enemy's guns. In spite of severe damage to the aircraft, Flt. Lt. Campbell was able to fly home safely.

Act. Flt. Lt. W. I. COVINGTON, R.A.F.V.R., No. 97 Sqn.—Flt. Lt. Covington has completed a large number of operational sorties, including several successful attacks on Berlin, Essen and Milan. Despite the heavy opposition usually encountered over such targets, this officer has continued to participate in operations with unminished ardour.

Act. Flt. Lt. D. L. DANIEL, D.F.M., R.A.F.V.R., No. 207 Sqn.—An outstanding captain of aircraft, Flt Lt. Daniel, now on his second tour of operational duty, has completed a very large number of operational sorties. On one occasion in January, 1943, this officer's aircraft was attacked by an enemy fighter. By his skill he was successful in avoiding damage to his aircraft and in enabling his rear gunners to shoot the enemy down in flames.

Act. Flt. Lt. G. C. DAY, No. 103 Sqn.—This officer, since being posted to his present squadron for his second tour of operational duty, has completed a number of sorties, most of which have been attacks on the more heavily defended targets in Germany.

Act. Flt. Lt. A. E. EDMUNDS, R.A.F.V.R., No. 106 Sqn.—Many of the sorties completed by this officer have been attacks on the vital and heavily defended targets in the Ruhr. Two of these have been on Essen and three against Duisburg. On one of the Essen raids, despite fierce opposition, Flt. Lt. Edmunds made two runs over the target to ensure accurate bombing. A few nights later he fought off two determined fighter attacks while bombing Duisburg. Other of his missions have been against naval objectives in France and Italy. Flt. Lt. Emunds has always displayed great determination in attack and in securing photographs.

Act. Flt. Lt. F. B. GASCOIGNE, R.A.A.F., No. 461 (R.A.A.F.) Sqn.—Flt. Lt. Gascoigne was navigator of an aircraft which was sighted and attacked two enemy submarines on successive days. One of the U-boats was destroyed. Flt. Lt. Gascoigne has also assisted in air/sea rescue operations, and recently was navigator of a crew which successfully fought off six enemy aircraft.

Act. Flt. Lt. P. N. HARRIS, R.A.F.V.R., No. 415 (R.C.A.F.) Sqn.—In May, 1943, Flt. Lt. Harris was pilot of an aircraft detailed to attack a convoy off the Frisian Islands. The convoy was sighted and a large vessel attacked, despite intense and accurate anti-aircraft fire. One ship was destroyed. On other occasions he has attacked and sunk enemy shipping.

Act. Flt. Lt. J. HUDSON, R.C.A.F., No. 425 (R.C.A.F.) Sqn.—Flt. Lt. Hudson has taken part in numerous operational missions over such targets as Hamburg, Cologne, Mannheim and Turin, displaying throughout exceptional qualities of leadership, gallantry and devotion to duty.

SERVICE AVIATION

Act. Flt. Lt. T. A. JULIAN, R.C.A.F., No. 100 Sqn.—This officer has completed numerous operational sorties. On one occasion he flew his aircraft safely back from a mission to the Ruhr under very difficult circumstances. Many of his flights have been attacks on the most heavily defended targets in Germany, including Essen, Kiel, Hamburg and Duisburg.

Act. Flt. Lt. G. C. KEYS, R.A.A.F., No. 460 (R.A.A.F.) Sqn.—Flt. Lt. Keys has been employed for some time as captain of an air crew which has completed a number of successful raids on enemy objectives. His tour of duty has included no fewer than six attacks on Essen, two on Berlin, and many others on the most heavily defended targets in enemy territory. During one of his missions to Berlin one engine ceased to function while still 30 miles from the target. Despite this handicap, Flt. Lt. Keys continued and completed the sortie effectively.

Act. Flt. Lt. E. W. MITCHELL, R.A.F.V.R., No. 61 Sqn.—This officer is at present employed as squadron navigation officer, and by his exceptional skill on all his sorties has set a magnificent example to the rest of the squadron. He has completed numerous operational flights, including attacks on Berlin and the heavily defended targets in the Ruhr such as Essen, which he has attacked six times.

Outstanding Captain

Act. Flt. Lt. D. C. LOWE, R.A.F.V.R., No. 75 (N.Z.) Sqn.—Flt. Lt. Lowe has proved to be an outstanding captain of aircraft throughout many operational missions over such heavily defended targets as Hamburg, Essen and Berlin. From these sorties he has frequently brought back photographs of the target area. On more than one occasion he has successfully evaded attacks by enemy night fighters. He has also brought his aircraft back to base when almost disabled by anti-aircraft fire.

Act. Flt Lt. J. M. ROWE, No. 158 Sqn.—This officer has displayed a spirit of real enthusiasm for navigational work. He has completed a large number of operational missions, many of them over strongly defended targets such as Berlin, Essen, Cologne and Duisburg.

Act. Flt. Lt. R. A. SCHOALES, R.C.A.F., No. 404 (R.C.A.F.) Sqn.—This officer has taken part in a large number of operational sorties. In April, 1943, Flt. Lt. Schoales acted as leader of a formation of aircraft detailed to escort four torpedo-carrying Beaufighters on a shipping strike. The complete success of this operation was largely due to the skill and determination with which this officer led the formation, enabling the torpedo-carriyng aircraft to sink one enemy merchant vessel without themselves being hit.

Act. Flt. Lt. L. J. SIMPSON, R.A.A.F., No. 460 (R.A.A.F.) Squ.—Act. Flt. Lt. Simpson has participated most commendably in no less than six attacks on Essen and three on Berlin. On one mission to Duisburg, while still 60 miles from the target, the port outer engine and hydraulic power to the rear turret of his aircraft failed. In spite of this, the mission was continued and successfully completed. This officer has constantly displayed a fine spirit in the face of danger and has achieved an outstanding record of gallantry.

Act. Flt. Lt. N. SMITH, R.C.A.F., No. 158 Sqn.—This captain of aircraft has displayed skill, courage and determination to a marked degree. His operational record, which includes missions to such strongly defended centres as Hamburg, Essen and Berlin, constitutes a fine example to others.

Act. Flt. Lt. K. W. SWANN, No. 12 Sqn.—Flt. Lt. Swann has completed many operational sorties during his service with this squadron. These operations have included attacks on Berlin, Essen, Hamburg, Munich and Stettin.

Act. Flt. Lt. W. M. THEOBALD, R.A.F.V.R., No. 7 Sqn.—This officer has completed a large number of operational sorties. His operational record has been characterised by cool courage and accurate navigation in the face of enemy opposition.

Act. Flt. Lt. J. A. WAKEFORD, R.A.F.V.R., No. 9 Sqn.—This officer has completed a large number of bombing raids against enemy targets. As captain of aircraft, he has displayed a high degree of courage and tenacity in attacking heavily defended targets in enemy territory, which have included such heavily defended centres as Bremen, Duisburg, Essen, and a number of mine-laying sorties.

Act. Flt. Lt. P. B. WHITE, R.C.A.F., No. 77 Sqn.—This officer has displayed initiative and courage in the completion of his duties in the course of many operational missions. These have included sorties against Berlin, Duisburg and Rostock, as well as a number of anti-submarine patrols.

F/O. H. BECKETT, R.C.A.F., No. 115 Sqn.—As navigator, this officer has completed numerous sorties over enemy territory. These have included flights to such heavily defended objectives as Hamburg, Berlin and Essen, and several long-distance missions to such places at Spezia and Turin.

F/O. A. J. W. BIRCH, R.A.F.V.R., No. 58 Sqn.—This officer has participated in a large number of operational sorties. In April, 1943, F/O. Birch successfully attacked a U-boat. In May he made another excellent attack on a U-boat which was probably destroyed.

F/O. G. BOND, R.A.F.V.R., No. 51 Sqn.—This officer has displayed great keenness and ability as a navigator both on anti-submarine sweeps and bombing raids. On one occasion, when his aircraft had to be ditched owing to engine failure, F/O. Bond spent several hours in a dinghy. He has also been involved in several air crashes. Despite these harassing occurrences, his courage and determination have remained unshaken.

F/O. G. S. BOWERS, R.A.F.V.R., No. 464 (R.A.A.F.) Sqn.—This officer has displayed steadiness, ability and efficiency on a number of operational sorties which have included numerous daylight flights. On one occasion F/O. Bowers navigated his aircraft safely back to base after it had sustained severe damage in an encounter with an enemy fighter, during which the wireless operator was wounded and the rear gunner killed.

F/O. A. A. CREAMER, R.A.F V.R., No. 49 Sqn.—This officer's aircraft has been navigated to the target accurately and brought back to base safely on all occasions, even when violent enemy opposition has been encountered. F/O. Creamer has operated against Berlin Spezia, Duisburg, Munich, and many other difficult and distant targets, invariably displaying high gallantry and devotion to duty.

F/O. T. R. DANBY, R.A.F.V.R., No. 101 Sqn.—This officer has now completed a most successful tour of operations. He has proved himself to be a worthy member of a very gallant crew, which has attained outstanding success over many well-defended targets in Germany, such as Cologne, Essen and Berlin.

F/O. A. R. DAWES, R.A.F.V.R., No. 10 Sqn.—This officer has participated in numerous anti-submarine patrols in the Bay of Biscay, and also in bombing attacks on targets such as Berlin, Stettin, Essen and Duisburg. On several occasions his aircraft has been damaged and he has been forced to make crash landings. These harassing experiences have not in any way diminished his enthusiasm for operational flying.

F/O. D. J. DRAKE, D.F.M., No. 156 Sqn.—In the course of two outstanding tours of duty, F/O. Drake has bombed most of the important enemy targets, including Berlin, Bremen, Cologne and Spezia, exhibiting outstanding gallantry and devotion to duty throughout.

General Montgomery inspecting a guard of honour, drawn from the R.A.F. Regiment, during his visit to Fighter Command headquarters. On the left is Air Marshal Sir Trafford Leigh-Mallory, A.O.C. in C. Fighter Command.

Conspicuous Gallantry Medal (Flying)

W/O. D. C. C. BUSBY, No. 156 Sqn.—W/O. Busby, now on his second tour of operational duty, has taken part in a large number of operational sorties against targets in Germany, Italy and enemy-occupied territory. He has secured some excellent photographs.

Flt. Sgt. F. E. MATHERS, R.A.A.F., No. 77 Sqn.—One night in June, 1943, Sgts. French and Spedie were the wireless operator/air gunner and rear gunner respectively of an aircraft piloted by Flt. Sgt. Mathers which attacked Mulheim. Whilst over the target area, the bomber was subjected to heavy fire from the ground defences and was repeatedly hit. Two engines were rendered unserviceable in quick succession, while the starboard aileron control was shot away and three petrol tanks were pierced, all of which leaked rapidly. In spite of this, Flt. Sgt. Mathers flew clear of the defences and set course for this country. On the return flight the bomber gradually lost height and all moveable equipment, including the guns of the mid-upper turret and some ammunition, were jettisoned. Shortly after crossing the enemy coast the disabled aircraft was intercepted by an enemy fighter. In the ensuing engagement, Sgt. Spedie skilfully used his guns and, eventually with a devastating burst from close range, he shot the attacker down into the sea. The bomber was down to 500 feet, but, displaying superb airmanship, Flt. Sgt. Mathers, receiving much assistance from Sgt. French who diligently worked his wireless apparatus to obtain direction fixes, struggled on to reach an airfield near the coast. Although the undercarriage could not be lowered, this pilot successfully effected a crash-landing

Distinguished Flying Medal

Sgt. G. E. FRENCH and Sgt. W. F. SPEDIE, both of No. 77 Sqn.—For citation, see Flt. Sgt. MATHERS, C.G.M.

Sgt. R. S. TAMPLIN, No. 23 Sqn.—As navigator, this airman has participated in many sorties, some of them whilst based in England. On one occasion, when his aircraft crash-landed and caught fire, Sgt. Tamplin was mainly instrumental in extricating his seriously injured pilot from the cockpit. In the Middle East, Sgt. Tamplin has participated in many attacks on rail communications in Sicily and Italy.

Sgt. M. CHEPIL, R.C.A.F., No. 428 (R.C.A.F.) Sqn.—This airman captained an aircraft detailed to attack a target at Le Creusot one night in June, 1943. Soon after crossing the enemy coast the hydraulic system in the bomber became unserviceable, but Sgt. Chepil continued his flight. Later, one engine caught fire and became unserviceable. In spite of this the target was bombed, after the bomb doors had been opened by an emergency method. Sgt. Chepil afterwards flew the damaged aircraft to base.

Sgt. L. CLIFTON, No. 90 Sqn.—This airman was the flight engineer of an aircraft which attacked Gelsenkirchen one night in June, 1943. During the operation the aircraft was attacked by an enemy fighter and sustained damage. The controls to one of the petrol tanks was affected and a fire broke out near the ammunition boxes. Sgt. Clifton coolly re-adjusted the petrol controls to ensure on adequate supply to the engine and then tackled the fire, which he put out with an extinguisher.

Sgt. H. GOTTWALTZ, No. 49 Sqn.—One night in June, 1943, this airman was the flight engineer of an aircraft which attacked Cologne. Whilst over the target area, the bomber was hit by anti-aircraft fire. The starboard outer engine caught alight, but Sgt. Gottwaltz dealt with the situation promptly and effectively. Some time later, the port inner engine became faulty, but Sgt. Gottwaltz was able to keep it functioning until his pilot reached an airfield in this country.

Sgt. W. TOWSE and Sgt. N. J. PAWLEY, both of No. 15 Sqn.—One night in June, 1943, these airmen were captain and wireless operator/air gunner respectively of an aircraft detailed to attack Wuppertal. Shortly after crossing the enemy coast, on the outward flight, the bomber was engaged by a hostile aircraft which was shot down and Sgt. Towse flew on to the target and bombed it. Shortly afterwards, the bomber was hit by anti-aircraft fire and fragments of shrapnel pierced four of the petrol tanks. One of them caught fire and the situation became serious. Nevertheless, Sgt. Towse attempted to quell the flames by diving his aircraft violently and, in this way, succeeded in his purpose. Much petrol had leaked from the damaged tanks and course was set for this country. Shortly after crossing the enemy coast the petrol supply became exhausted and the aircraft came down on to the sea and quickly sank. Although he was trapped below the water, Sgt. Towse succeeded in freeing himself and escaped through the hatch and was hauled aboard the dinghy by Sgt. Pawley. The crew were eventually rescued.

Flt. Sgt. F. H. J. ASHLEY, No. 149 Sqn.—Flt. Sgt. Ashley, now on his second tour of operational duty, has taken part in a large number of operational sorties. This airman has been attacked six times by enemy fighters, two of which were destroyed. One night in December, 1942, following an attack on Mannheim and while still over the target area, Flt. Sgt. Ashley's aircraft was hit by anti-aircraft fire and badly damaged. Displaying superb airmanship, Flt. Sgt. Ashley brought the aircraft safely back to England, where, owing to the failure of the engines, the aircraft had to be abandoned.

Flt. Sgt. H. BIBBY, No. 254 Sqn.—A first-class navigator, Flt. Sgt. Bibby has always maintained the highest standard of efficiency both on the ground and in the air, and by his devotion to duty and keenness has set an excellent example to the other members of his squadron.

Flt. Sgt. G. W. C. CANDLIN, No. 83 Sqn.—Flt. Sgt. Candlin has completed a large number of operational sorties, many of which have been against such heavily defended targets as Berlin, Hamburg, Bremen and Kiel. Throughout his tour of operational duty this airman has shown consistent and unflinching determination to lead his aircraft through the defences with the utmost skill, finally releasing his bombs with great accuracy and precision and securing excellent photographs.

Flt. Sgt. P. J. COFFEY, R.A.A.F., No. 103 Sqn.—Flt. Sgt. Coffey has taken part in numerous operational sorties, the majority of which have been against the enemy's most heavily defended targets, including three against Berlin.

Flt. Sgt. P. F. CONNELL, R.C.A.F., No. 83 Sqn.—This airman has completed a large number of operational sorties. He has taken part in attacks on targets at Essen, Dusseldorf and Munich. In December, 1942, while employed as mid-upper gunner, Flt. Sgt. Connell greatly assisted his captain to evade an enemy night fighter which attacked their aircraft five times on the outward journey to Munich, and later, when the enemy fighter eventually gave up, assisted in putting out the fire caused by the enemy.

Military Medal

Cpl. W. A. PARKER.
A/C.2 F. ADDISON.

B.E.M. (Mil.)

Sgt. (now P/O.) H. C. SHARPE, R.A.F.V.R.—In October, 1942, Sgt. Sharpe was wireless operator of a Whitley aircraft which, owing to engine trouble, was forced to alight on the sea approximately 300 miles west of Land's End. Owing to the accurate bearing sent out by him the crew were quickly rescued. The captain and other members of the crew were shaken and dazed as a result of the forced descent, but this airman promptly launched and equipped the dinghy, later diving overboard and assisting two injured comrades into it. Sgt. Sharpe showed courage and resource, and, on his own initiative, took charge of the crew until the captain recovered sufficiently to assume command.

(Right) Air Chief Marshal Sir F. Bowhill, A.O.C. in C. Transport Command, with (left) Air Marshal Sir John Linnell, Deputy A.O.C. in C. Middle East, during a visit to air bases in the Middle East. Sqn. Ldr. R. Edwards is in the centre.

Roll of Honour

Casualty Communiqué No. 366.

THE Air Ministry regrets to announce following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 100 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—P/O. K. S. Bush; Sgt. A. Campbell; Sgt. R. E. Franklin; F/O. A. J. Rea, D.F.M.; W/O. L. C. Telford.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. B. S. Blundell; P/O. E. A. R. Briant; P/O. T. D. Brown; Sgt. W. Buckley; Sgt. E. D. Butler; Sgt. E. W. J. Chaldecott; Sgt. E. C. A. Coules; Sgt. J. Coyne; Flt. Sgt. D. L. T. Craig; Sgt. J. D. Craig; Sgt. E. J. Cutting; Sgt. W. Duncombe; Sgt. A. B. Fraser; Act. Flt. Lt. J. R. Frith; P/O. R. H. Groom; Sgt. T. Hickman; P/O. P. G. Hopkins; P/O. S. Howlett; Sgt. W. J. Justice; Flt. Sgt. W. H. McAlwane; Sgt. F. A. McCluskey; Sgt. D. McNamee; W/O. T. M. Manning; Flt. Sgt. D. H. Methven; P/O. K. E. M. Mitchell; Sgt. J. H. Scorer; Sgt. J. Skipsey; Sgt. H. C. Taylor; Sgt. E. S. Thomas; Sgt. G. H. Wilson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. J. E. Bailey; Sgt. E. D. Booty; Wing Cdr. C. Charlton-Jones; Sgt. S. A. Claridge; Sgt. J. Collumbell; Sgt. J. Culley; Sgt. C. Drury; P/O. A. Eaton; Sgt. S. V. Goodhew; Sgt. J. W. Gray; F/O. R. A. Haig; Flt. Sgt. A. Harker; Act. Flt. Lt. N. Harrison; Sgt. W. C. H. Hiscock; Sgt. W. Hodgson; P/O. J. B. Holdsworth; Sgt. J. W. E. Holland; Flt. Sgt. M. J. Kynaston; Sgt. R. G. A. Lee; Sgt. K. W. McAuliffe; Sgt. J. D. R. MacGillivray; Sgt. A. C. Rault; Sgt. P. Caten; Sgt. R. L. Rodwell; Sgt. R. J. Roy; Sgt. R. A. Russell; F/O. A. L. Searby; P/O. C. J. Stevenson; Sgt. J. H. Storey; Sgt. B. D. Swain; Sgt. S. Swain; Sgt. H. W. Vinter; P/O. E. A. Wagstaff; Sgt. W. Walker; Sgt. A. W. Waller; Sgt. B. B. Warren; Sgt. J. A. Waterman.

WOUNDED OR INJURED IN ACTION.—Flt. Lt. A. R. D. Barratt; Sgt. R. O. Buckle; F/O. J. F. Clark; Sgt. A. D. Garlick; Sgt. T. P. Petrie; Flt. Sgt. T. R. D. Smith.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. W. A. Blackwell; F/O. H. Entwistle; F/O. C. Harrison; Sgt. T. Healop.

MISSING.—Sgt. G. E. Anderson; Flt. Sgt. H. V. P. Archer; P/O. J. B. Binns; Sgt. L. S. Blanchard; Sgt. R. H. Boone; Sgt. G. H. Brooks; Sgt. J. H. Burrow; Sgt. D. E. Burrows; Sgt. C. K. Burton; Act. Wing Cdr. H. F. Burton, D.S.O., D.F.C.; Sgt. E. Cassingham; F/O. C. K. Cazaly; F/O. D. Coales; Sgt. S. G. Coleman; P/O. L. J. Collins; Sgt. P. J. Cooke; Act. Wing Cdr. P. T. Cotton, D.F.C.; P/O. G. Cribbin; Sgt. T. A. Davies; Sgt. E. S. Davis; Sgt. J. Domnitz; F/O. M. Donaldson; Sgt. W. J. Douglas; Sgt. W. D. Eaglesham; Flt. Sgt. D. E. Edwards; Sgt. A. G. Endicott; P/O. R. N. Fewtrell; Sgt. P. Fox; Flt. Sgt. J. M. Gavagan; Sgt. R. G. Goodenough; F/O. D. S. Gooderham; Act. Wing Cdr. J. Goodhead; Sgt. J. Gorton; Flt. Lt. I. P. G. Goudge; Sgt. T. Goulde.; Sgt. A. E. Graham; Sgt. D. M. Gray; Flt. Sgt. F. J. Greenwood; Flt. Sgt. J. Grindley; Sgt. S. F. Hammond; Act. Sqn. Ldr. O. V. Hanbury, D.S.O., D.F.C.; Sgt. J. Hardman; Wing Cdr. R. A. I. Harrison; Sgt. N. M. Hatch; Sgt. A. E. Hayes P/O. G. R. Herbert; Sgt. L. Horricks; Sgt. J. Innes; Flt. Sgt. J. L. Jeal; P/O. J. D. Jefferey; Sgt. A. S. Jones; Sgt. A. N. Lancaster; F/O. G. R. Lindsay; Sgt. J. A. Lobban; P/O. J. N. Lockwood; F/O. L. C. Long; Sgt. R. E. Longster; Sgt. J. L. S. Lowings; P/O. H. T. McAualand; P/O. G. McVitty; Act. Sqn. Ldr. J. R. Manahan, D.F.C.; Sqn. Ldr. T. B. Marshall; Sgt. F. H. Martin; Flt. Sgt. B. Millward; Sgt. J. H. Mitchell; Sgt. W. E. H. Nicholls; W/O. G. F. Paddon; Sgt. J. J. Pawsey; Sgt. A. P. Price; Sgt. A. E. Quaife; Sgt. R. S. Richmond; Sgt. W. A. Robinson; Sgt. S. Rogers; Sgt. E. J. Sayer; Sgt. F. W. Shirley; Sgt. K. J. Smith; Sgt. B. H. Stephenson; Sgt. F. Stewart; Sgt. D. B. Tibble; Sgt. J. W. Walsh; Sgt. W. G. Watts; Sgt. H. J. Webb; Sgt. V. Wells; Sgt. J. J. Wemyss; Sgt. A. J. N. Wilson; Sgt. P. F. Wright; Act. Group Capt. R. G. Yaxley, D.S.O., M.C., D.F.C.; Act. Sqn. Ldr. J. K. Young.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—A/C.1 S. B. Goodwin.

KILLED ON ACTIVE SERVICE.—Sgt. J. T. Anderton; Sgt. P. F. Baker; L.A/C. J Drummond; L.A/C. J. Ellis; L.A/C. R. J. Fane; Sgt. N. A. Isherwood; L.A/C. K. F. Jeeves; Cpl. R. V. Jupp; P/O. G. Lammie; Wing Cdr. J. H. Little, D.F.C.; Sgt. J. J. Mangum; Sgt. F. G. Haydon; L.A/C. K. Murray; Sgt. J. W. E. Robinson; L.A/C. S. Shaw; W/O. D. H. Styles, D.F.M.; Sgt. W. H. J. Woodland.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—L.A/C. E. H. Bambridge; Act. F/O. R. Broad; L.A/C. F. C. Curtis; Sgt. J. S. Stephens; L.A/O. R. F. Stephenson; L.A/O. A. W. Sutton.

DIED ON ACTIVE SERVICE.—L.A/C. A. Carr; A/C.1 J. Fehilly; L.A/C. A. E. Hodson; L.A/C. J. Murphy.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW.2 M. A Miller.

Royal Australian Air Force

KILLED IN ACTION.—Act. Flt. Lt. E. G. Bamkin; Flt. Sgt. B. J. B. Brocksopp; P/O. C. H. Bromhall; P/O. C. J. Randle.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. J. N. Barker; Flt. Sgt. J. H. Woodford.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. H. A. Dalzell; Sgt. C. W. S. Oliver; Sgt. R. W. Taylor; Sgt. L. S. Williams.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. J. A. Grant; Sgt E. J. Kerr.

MISSING.—Act. Flt. Lt. J. M. Desmond; Sgt K. E. Fletcher; Sgt. F. W. Green; Sgt. J. F Mell; Sgt. E. D Milliken; Flt. Sgt. A. G. Nourse; Act. Sqn. Ldr. E. Paul; P/O. J. R. Ryalls.

FOUR SQUADRON CRESTS: (Left to right) No. 216 Squadron, "CCXVI Dona Ferens" (216 Bearing Gifts); No. 148 Squadron, "Trusty"; No. 70 Squadron, "Usquam" (Anywhere); No. 64 Squadron, "Tenax Propositi" (Firm of Purpose).

SERVICE AVIATION

KILLED ON ACTIVE SERVICE.—Sgt. R. J. P. Ricketts.

Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. J. Donaldson; Sgt. W. H. Irvine; Sgt. J. Needler; Sgt. J. L. Nibblet; Sgt. J. A. Smith; Sgt. K. B Tanner.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. E. A. F. de Bartok D.F.C.; P/O. E. M. Marks; Flt. Sgt. J. Molesworth; Flt. Sgt. W. J. A. Shapten; P/O. G. J. Strutt, D.F.M.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. J. Burns; P/O. G. W. Dalton; P/O. R. P. Davies; P/O. R. H. Logan; Sgt. A. J. Maclachan; F/O L. W. Powell, D.F.C.; Sgt. B. L. Tedford; P/O. F. L. Vaupel.

MISSING.—Act. Sqn. Ldr. P. L. I. Archer, D.F.C.; Sgt. J. H. Bambridge; Act. Flt. Lt. L. A. Bourgeois; Act. Flt. Lt. J. B. Buckley; Sgt. D. E. Campbell; Flt. Sgt. G. D. Coe; P/O. R. P. Conroy; P/O. G. H Debussac; P/O. G. R. Densmore; Sgt. A. Dixon; F/O. W. A. Follows; Sgt. P. Hollyer; Sgt. J. Kopchuk; Sgt. K. W. Lawson; Sgt. G. A. Leitch; P/O. G. A. McClintock; F/O. D. J. Macmillan; F/O. J. E. McNamara; Sgt D. S. McRae; Flt. Sgt. G. A. Nelson; Sgt. J. P. G. O'Reilly; Sgt. C. F. Orlinski; Sgt. D. E. Palmatier; Sgt. W. G. Parkinson; Sgt. J. A. M. Philpott; P/O. M. B. Spence; Sgt. E. A. Star; Sgt. L. P. R. Taillefer; Sgt. H. D. Warner; Sgt. S. Zareikin; Sgt. R. Zeidel.

KILLED ON ACTIVE SERVICE.—F/O. S. P. R. Brouillette; W/O. R. J. Burrell; Sgt. W. I. Hereford; F/O. E. J. K. LeClaire; Sgt. S. Rosenstein.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. J. W. Larson.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. A E. Arnold; Sgt. R. H. Crabtree; F/O. B. Dallenger; F/O. L. St. G. Dobbin; Sgt. H. O. Goddard; Sgt. J. L. Jury; Flt. Sgt. D. T. Lamb.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. W. J. Anderson; P/O. J. D. McKeown; Flt. Sgt. E. Perks.

MISSING.—F/O. E. J. McSherrey.

KILLED ON ACTIVE SERVICE.—Sgt. N. J. Collins; Flt. Sgt. T. Cosson; Flt. Sgt. R. D. Wallace.

South African Air Force

KILLED ON ACTIVE SERVICE.—Lt. D. P. Wilter.

Casualty Communiqué No. 267.

Of the names in this list 99 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. H. S. Brown; F/O. J. Coles; Sgt. K. B. Cooper; F/O. R. C. Cornelius; Sgt. F. G. Crofts; Flt. Sgt. L. Franklin; Sgt. R. O. C. Harris; Sgt. G. E. F. Johnston; Sgt. T. McDonagh; Sgt. G. E. Noble; Sgt. J. E. Robbins; Sgt. T. G. Smale; W/O. G. W. Tibbetts, D.F.M.; Sgt. M. L. V. Watson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. H. V. Anson; Sgt. R. H. Ashwell; Sgt. W. S. Collins; Flt. Sgt. J. R. Davies; P/O. J. A. Gruber; Sgt. S. E. F. Hatch; Flt. Sgt. J. L. Lawler; P/O. R. G. Lewis; Flt. Sgt. H. J. M. McDonnell; P/O. D. H. MacNaughton; Sgt. A. Norton; Sgt. W. F. Parker; Flt. Lt. M. G. Robin; Sgt. J. B. Wilkes; Flt. Sgt. B. A. Wolstencroft.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. M. A. Barrett; P/O. W. G. Campbell; Sgt. N. W. S. Cantwell; Sgt. S. A. Carter; P/O. A. F. Cheetham; P/O. P. Copeland; P/O. J. E. Corrie; Sgt. J. Cowen; Sgt. J. T. Davidson; Sgt. J. D. Dickie; Sgt. R. G. Fewtrell; Sgt. J. H. Fletcher; P/O. C. D. A. Gartside; Sgt. D. H. Glover; P/O. B. E. Grein; Flt. Sgt. T. S. G. Grieve; Sgt. G. R. Halliwell; Sgt. A. Harkness; Sgt. K. Haworth; P/O. C. M. Henning; P/O. F. C. Holloway; P/O. A. R. Houstoun; Sgt. H. James; Sgt. J. L. Johnson; P/O. J. H. Kinsey; Flt. Sgt. J. Kirkwood; Sqn. Ldr. J. G. L. Knowles; Sgt. W. E. Konigkramer; Flt. Sgt. C. H. R. Leyshon; Sgt. E. Lister; Sgt. A. C. Lovegrove; Sgt. W. J. Maas; P/O. F. J. Mee; Sgt. J. I. C. Morris; Flt. Sgt. L. H. Mutter, D.F.M.; Sgt. K. Norgate; Flt. Sgt. J. E. Richards; P/O. N. W. Rowell; Sgt. C. D. Shepherd; Flt. Sgt. H. W. Shepherd; Act. Sqn. Ldr. I. A. Stewart, D.F.C.; P/O. E. W. Swatton; Sgt. T. R. Thomas; Sgt. W. Toole; P/O. J. A. Wain; Sgt. C. H. Williams; Sgt. E. H. Williams; Flt. Sgt. J. A. Williams.

WOUNDED OR INJURED IN ACTION.—P/O. S. L. Drew.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. J. H. Bloxwich; Sgt. F. E. Bobby; Sgt. V. J. Browne; Sgt. M. L. Buxton; F/O. E. R. Curtis; P/O. E. F. Daniel; Sgt. E. G. Halston; Sgt. G. Hayes; P/O. P. C. Jackson; Sgt. D. J. F. Jelkins; Sgt. B. King; Sgt. R. Leyland; Sqn. Ldr. D. G. Ogilvie, D.F.C.; P/O. E. Parry; Sgt. V. S. Platt; W/O. H. W. Price; Sgt. D. J. A. Robson; Sgt. A. Spence; Flt. Lt. W. A. Tetley, D.F.C.; Sgt. F. M. Traynor; Sgt. W. E. Waggett; Sgt. F. G. Williams.

MISSING.—F/O. L. W. Abbis; Sqn. Ldr. B. S. Ambrose; Sgt. H. Anderson; Sgt. H. Baker; Sgt. D. W. Bartholomew; P/O. W. T. Batson, D.F.M.; Flt. Lt. L. R. Betts; Sgt. E. H. Bond; P/O. D. C. Bovis; Sgt. J. A. Bramble; Sgt. W. J. Brookes; Sgt. J. G. Brown; Sgt. R. B. Butler; Flt. Sgt. J. E. Buxton; Sgt. W. Calvert; F/O. L. F. Campbell; Sgt. K. M. Campbell; P/O. M. C. Carter; Sgt. A. W. Chapman; Sgt. L. N. Connor; Sgt. L. F. Cook; Sgt. R. J. Cook; Sgt. W. H. Cox; W/O. E. Dainty; Sgt. J. Dawson; Sgt. T. W. Dixon; Sgt. W. J. Fraser; F/O. E. S. Garai; Flt. Sgt. C. H. Garner; Sgt. L. C. Gearing; Sgt. A. E. J. Gibbs; P/O. W. J. Glenn, D.F.M.; P/O. E. M. Gold; Flt. Sgt. R. Goldstraw; Flt. Sgt. E. W. Goodheart; Sgt. G. A. A. Grant; Sgt. W. D. Gray; Sgt. R. R. Hale; Sgt. W. Hallows; P/O. J. A. Hawes; Sgt. W. F. Henderson; Sgt. T. C. Herbert; Flt. Sgt. T. W. Hill; Sgt. W. A. Hobbis; Sqn. Ldr. D. C. MacKenzie; Sgt. S. G. Holroyd; Sgt. R. L. Howarth; Sgt. W. R. Howes; Sgt. A. Hunter; Sgt. G. M. Inness; Sgt. K. A. Jenkins; Sgt. G. A. Jones; Sgt. R. Jones; P/O. J. Kay; Sgt. R. C. Kerley; Sgt. J. A. Kinnear; Flt. Sgt. J. Lawson; Sgt. R. G. Lepetit; Sgt. E. R. McConnell; Sgt. A. MacDonald; F/O. F. MacKelden; Sgt. J. F. McLusky; P/O. G. May; Sgt. F. C. W. Michell; F/O. E. R. Midgley; Flt. Sgt. A. J. Mills; Sgt. J. Monteith; Sgt. A. D. Moore; Sgt. M. W. Moore; Sgt. A. F. Muir; Sgt. I. B. Nicol; Flt. Sgt. F. Norman; P/O. F. Oliver; Sgt. A. L. Payne; Sgt. T. L. Portrey; Sgt. A. G. Rawlings; Sgt. A. Roberts; F/O. S. Roxburgh; Sgt. J. E. Senger; Sgt. W. Sharp; Sgt. E. Smith; Sgt. A. W. Stevens; Act. Flt. Lt. P. J. Stone, D.F.C.; Sgt. W. G. Styles; Sgt. J. C. Thomas; Sgt. E. Thurlow; Act. Flt. Lt. W. G. Walker; Flt. Sgt. A. J. Weber; Sgt. K. T. White; F/O. E. D. Wilcock; Sgt. D. L. Williams; Sgt. S. Wood; Sgt. A. C. Woodley; P/O. H. T. Woolridge.

KILLED ON ACTIVE SERVICE.—Sgt. A. V. Jones.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Cpl. L. J. Harding; Act. W/O. W. C. Pitman; Cpl. H. Wright.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. J. B. Llewelyn Roberts; Sgt. A. Pogrel; A/C.1 E. C. R. Senior.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. E. S. Stancliffe.

DIED ON ACTIVE SERVICE.—A/C.2 E. S. Barlow; Sgt. A. J. M. Crozier; A/C.2 W. E. Cuthbert; A/C.2 G. Rule; A/C.1 F. L. Senciall; W/O. P. Tully.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—L.A/CW. R. Shipp.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. F. R. Cummins; Sgt. J. E. Dalton; Flt. Sgt. J. M. Gibson.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. H. M. Gall; P/O. A. G. Grand.

WOUNDED OR INJURED IN ACTION.—F/O. R. D. V. Gippa.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. L. R. Brennan; Act. Flt. Lt. W. S. E. Dods; Flt. Sgt. T. W. R. Jones; Flt. Sgt. H. J. Ross.

MISSING.—P/O. S. G. Allan; Sgt E. A. Baldwin; Sgt. W. N. Cross; Flt. Sgt. W. A. M. Davis; Sgt. J. B. Donohoe; P/O. L. H. M. Hadley; F/O. U. D. H. Horne; Sgt. R. W. Maroney; F/O. L. Pietsch; Flt. Sgt. N R. Simpson; Flt. Sgt. J. V. Stanley; Flt. Sgt. B. F. Wilmot.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. E. R. Free; Sgt. J. J. Hill; Sgt. A. R. Webster.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. C. H. L. Bell; P/O. E. H. Brown; Flt. Sgt. A. A. Carcarry; Flt. Sgt. R. A. Clement; Sgt. W. T. Cranna; Sgt. A. C. Ewing; Act. Flt. Lt. L. D. Hillier; Sgt. R. W. Hughes; Sgt. W. T. B. McBratney; Sgt. T. McBride; Flt. Sgt. B. A. McGrath; Sgt. A. D. Muir; Sgt. G. W. Roberts; Flt. Sgt. F. R. Varrick; Sgt. J. D. Williams.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. G. R. Ash; Sgt. J. H. Durning; Sgt. J. R. Gilbert; F/O. W. A. White.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. R. D. Adgey; Act. W/O. J. L. Lee.

MISSING.—L.A/C. A. C. J. Coates; Sgt. L. T. Delorme; F/O. J. M. Drake; P/O. M. R. Felsen; Sgt. K. M. Gillies; P/O. P. J. Greig; P/O. N. D. Hayes; F/O. M. D. S. Hicks; L.A/C. J. B. Leitch; P/O. G. S. McCulloch; Sgt. G. D. McDougall; Sgt. D. A. Mackenzie; Sgt. J. C. Nicol; P/O. R. Quevillon; P/O. J. L. Rawson; Sgt. D. G. Richardson; P/O. R. S. Ross; Sgt. C. E. Schamehorn; Sgt. W. T. Seaman; F/O. A. Smith, D.F.C.

KILLED ON ACTIVE SERVICE.—P/O. J. W. Grant; W/O. R. A. Matthews.

DIED ON ACTIVE SERVICE.—Sgt. D. R. Kelly

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. I. A. Grant; P/O. J. L. Speedy.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. J. W. Badley; P/O. G. E. F. Brader; Flt. Sgt. R. W. Caskey; Act. Flt. Lt. C. D. Dobson.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. A. H. Smith.

MISSING.—F/O. V. W. Ferguson; F/O. G. J. Moorhead; P/O. A. A. H. Pullan; Sgt. D. P. Strong; Sgt. H. N. Wade.

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EVICE.—

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F/O. L.
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W. A.

ON.—Sgt.

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Felsen;
. N. D.
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G. D.
J. C.
Rawson;
gt. C. E.
Smith.

J. W.

Kelly

Force
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ON.—Flt.

G. J.
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